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ORIGINAL MEMOIRS.

FRONTAL AND ETHMOID SINUS EMPYEMA.

REPORT OF A CASE CURED BY OPERATION.

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IN view of the large amount of work which has been done in the past few years on the accessory sinuses of the nose, I have thought that it might be of interest to report a case of Empyema of the frontal and ethmoid sinuses which offered unusual features before a cure was accomplished. These cases are not very common, although the diagnosis and treatment of them has been more satisfactory in recent years, and all additional light that we can get on them will be of considerable help. In this case operative procedures had to be repeated several times, but in spite of this the resulting deformity which is shown in the accompanying photographs, is not so great as might have been expected. Whether more radical measures should have been attempted at the very beginning is a question. I am inclined to think that if this had been done at the outset much of the subsequent trouble might have been avoided.

It is of course much easier, in looking back, to realize what should have been done, and the indications in these cases are sometimes misleading, for the patients often recover from an acute inflammatory process without needing an operation; but when they have gone on to abscess formation, and the nitro-nasal drainage is insufficient, I think the treatment should be radical and thorough, removing as much of the diseased tissue as possible.

The patient, C. W. F., 63 years of age; married; German; janitor, was referred to me by Dr. F. Tilden Brown. He was first seen on April 23, 1905, and from his physician and his son the following history was obtained:

In January, 1905, he had an attack of influenza with marked supraorbital pain, which was followed by the formation of an abscess at the upper inner angle of the left orbit. This was opened at one of the smaller special hospitals in New York city on February 12 under cocaine anæsthesia, the patient remaining in the hospital three days; but as the discharge continued, he later had an extensive operation at one of the larger hospitals on March 16, on the left frontal sinus and left ethmoid. This operation is said to have been a "Killian." The wound was left open. He had erysipelas and was transferred to the isolation ward, returning to his home April 15. The wound gradually closed, and the patient did fairly well except that a purulent discharge continued from a silver tube which had been placed in the inner angle of the wound. On April 21, the tissues in the neighborhood began to swell and there was considerable pain associated with the swelling. On April 22, an incision was made over the outer part of the eyebrow, allowing the escape of considerable pus. He was at that time told of the necessity of a more extensive operation and was referred to Dr. Brown through whose kindness I then saw him, on April 23, 1905.

Examination showed a man in good general condition except for a marked general arterio-sclerosis with irregular pulse and irregular heart action. His temperature was normal. The local examination revealed the left eye closed with a marked cellulitis and infiltration of the tissues all about it, running well up onto the forehead. At the outer end of the old "Killian" scar, which

extended outward perhaps two-thirds the length of the supra-orbital ridge there was a short incision $\frac{3}{8}$ of an inch in length from which pus was oozing. Just below the inner canthus was a silver tube which ran straight backward and inward $\frac{1}{2}$ inch; pus also discharged freely from this. When the eyelids were separated, the conjunctiva was suffused and boggy. Rhinoscopic examination revealed the presence of pus and crusts on the site of the left middle turbinated, which had evidently been removed. There was a small drop of pus at the site of the anterior and of the right middle turbinated, which was also missing. This was the only time that I detected any pus in the right nostril.

April 23, under nitrous oxide and ether anæsthesia, after inserting a post-nasal tampon, an incision was made from the outer discharging cut through the old scar down onto the nasal process of the superior maxillary. The tissues were all very cedematous. At the inner angle of the wound a probe detected loose bare bone and this was grasped with forceps and removed. Viewed in the light of subsequent events, this was probably the remains of the supraorbital arch and the floor of the sinus which had been left at the previous operation. It was irregular in shape, about $1\frac{1}{4}$ inches long and $\frac{1}{2}$ inch in its broadest diameter. When this was removed the cavity of the left frontal sinus was exposed, enabling the landmarks to be made out. This cavity was full of spongy purulent necrotic mucous membrane. This was all thoroughly removed with the curette; all dead bone was removed and the edges of the sinus were smoothed down with rongeur forceps. There was a fair-sized opening into the ethmoid and nasal cavity; this was thoroughly curetted and enlarged to the diameter of $\frac{3}{8}$ of an inch. There was an absence of a considerable part of the septum between the two frontal sinuses, so that a probe passed into the right frontal sinus $\frac{1}{2}$ inch beyond the midline. The right frontal sinus was then thoroughly curetted through this opening, much necrotic mucous membrane being found. The condition of the patient did not warrant further extensive operative procedures, and it was hoped that by what had already been done and by further intranasal treatment on the right side the wound would close and give no more trouble. After thoroughly flushing out both the wound, and the nasal cavity through the canal made into it, plain gauze

packing was placed (*a*) through the canal into the nose, (*b*) into the right sinus and in the wound which was left open entirely, and a dry dressing applied.

Subsequent History.—The patient did most satisfactorily following the operation. He had a good night, very slight pain; and required no stimulation. His pulse and temperature remained practically normal, the temperature once getting to 99° F.

April 24.—The drain through the nose was removed; all other drains were loosened; œdema was gone, conjunctiva was much better.

April 28.—The wound was granulating well; there was a very small amount of discharge; his condition was fine. The conjunctiva had cleared up. The patient could use the eye.

May 9.—The wound had healed over the eye; there was not much discharge. Since operation the nose had been irrigated from above through the inner angle of the wound. The left antrum was washed out through the inferior meatus but no pus was obtained.

May 26.—The wound had healed except at the inner angle close to the nose, where there was a small opening still persisting. It had not been possible to pass a probe into the right sinus from the nose nor had it been possible to pass any instrument down into the right nostril from the wound, although several attempts had been made with bent probes. Peroxide of hydrogen injected into the right frontal sinus through the wound did not appear in the right nasal cavity. At this time it seemed doubtful whether there was any communication between the cavity thought to be the right frontal sinus and the nose. It was thought that this cavity might have been an enlarged prolongation of the left frontal sinus. Transillumination of the right frontal sinus was not satisfactory and revealed nothing.

Attempts were made by cauterization with saturated solution of nitrate of silver to close the fistulous opening, but a small amount of purulent discharge still coming from it, it was decided that operative procedures would be necessary to obliterate the cavity in order to cause the cessation of the discharge.

Operation.—August 2, 1905; Manhattan Eye, Ear and Throat Hospital. Nitrous oxide and ether anæsthesia; time



FIG. 1.



FIG. 2.



FIG. 3.

one hour. An incision was made from the fistulous opening directly across the bridge of the nose and curved out on the right supraorbital ridge to a point half-way between the inner and outer canthus. The skin and periosteum being elevated, the right frontal sinus was opened. It was found larger than was expected; extending outward to a point about halfway between the inner and outer canthus. There was considerable necrotic tissue in it. The anterior wall was removed entire and all projecting edges and irregularities were smoothed down. A probe was passed down apparently through the naso-frontal duct into the nose, but to my finger in the nostril it felt as though there was mucous membrane or perhaps slightly thicker tissue between it and the probe. The probe was pushed through this resisting tissue, and left in place while a post-nasal tampon was inserted. On the probe, as a guide, a small-sized bone curette was then passed down through the wound to the finger in the right nostril and the canal was curetted out. A strip of gauze was then carried through from above, brought out of the nostril and drawn back and forth, bringing away the debris of the curettage and enlarging the canal to nearly the diameter of the little finger. The necrotic tissue was then thoroughly curetted from the frontal sinus, from the canal leading to the old fistulous opening and all around this opening. All bony irregularities were removed and the cavities were made as smooth as possible. After thorough irrigation with boric acid solution, a plain gauze drain was passed into the right nostril from the right frontal sinus and one from the sinus out through the site of the old fistulous opening. The wound was then closed with interrupted silk sutures, except at the left angle where the fistula had been. Firm pressure was accomplished by dry compresses and a tight bandage.

The patient reacted from the operation well and left the hospital in a week. The wound healed satisfactorily except for slight stitch abscesses, which cleared up on the removal of the stitches and the application of a wet dressing for three days. The wound was irrigated a few days, the fluid coming out of the nose. The cavity was also irrigated from below through the canal which had been made through the ethmoid.

On August 19 there was absolutely no discharge from the old opening, which was getting very small, just admitting the

point of a probe and there was no discharge from the nose. The frontal sinus was apparently filling up satisfactorily.

On September 8 the wound had healed completely. There was no depression over the right frontal sinus; there was no discharge from the right nostril; there was a small drop of yellow pus at the site of the left middle turbinated which had been present from the beginning, and is due I think probably to a small amount of necrotic tissue in the ethmoid region. There was of course a marked depression over the left frontal sinus as the supraorbital ridge at its inner end had been removed. This is shown in the photographs.

Examination in December shows the condition the same except that a slight depression over the right frontal sinus exists.

I think the presence of some diseased tissue left in the right frontal sinus accounts for the failure of the wound to close after my first operation. There was no drainage from the right sinus into the nose, which may be accounted for either by excessive granulation tissue filling up the opening of the naso-frontal duct, or it may have been one of the cases in which the naso-frontal duct opens into an anterior ethmoid cell instead of into the middle meatus, or ends in a blind prolongation.

This latter view is rather supported by the fact that the probe which was passed through the naso-frontal duct in my second operation met with resisting tissue before it was passed through this into the nasal cavity. The rapidity with which the wound closed after the last operation forcibly illustrated nature's power of repair when irritating influences are removed.

If the patient's condition had been better I should have done a complete operation on both frontal sinuses at the first operation but his condition did not warrant more than was done at that time. I have reported the case and operations in full details as the conditions met were rather unusual. The very small amount of discharge from the left side which is still present is so slight as to be of no annoyance to the patient and the use of a cleansing spray daily makes him perfectly comfortable.

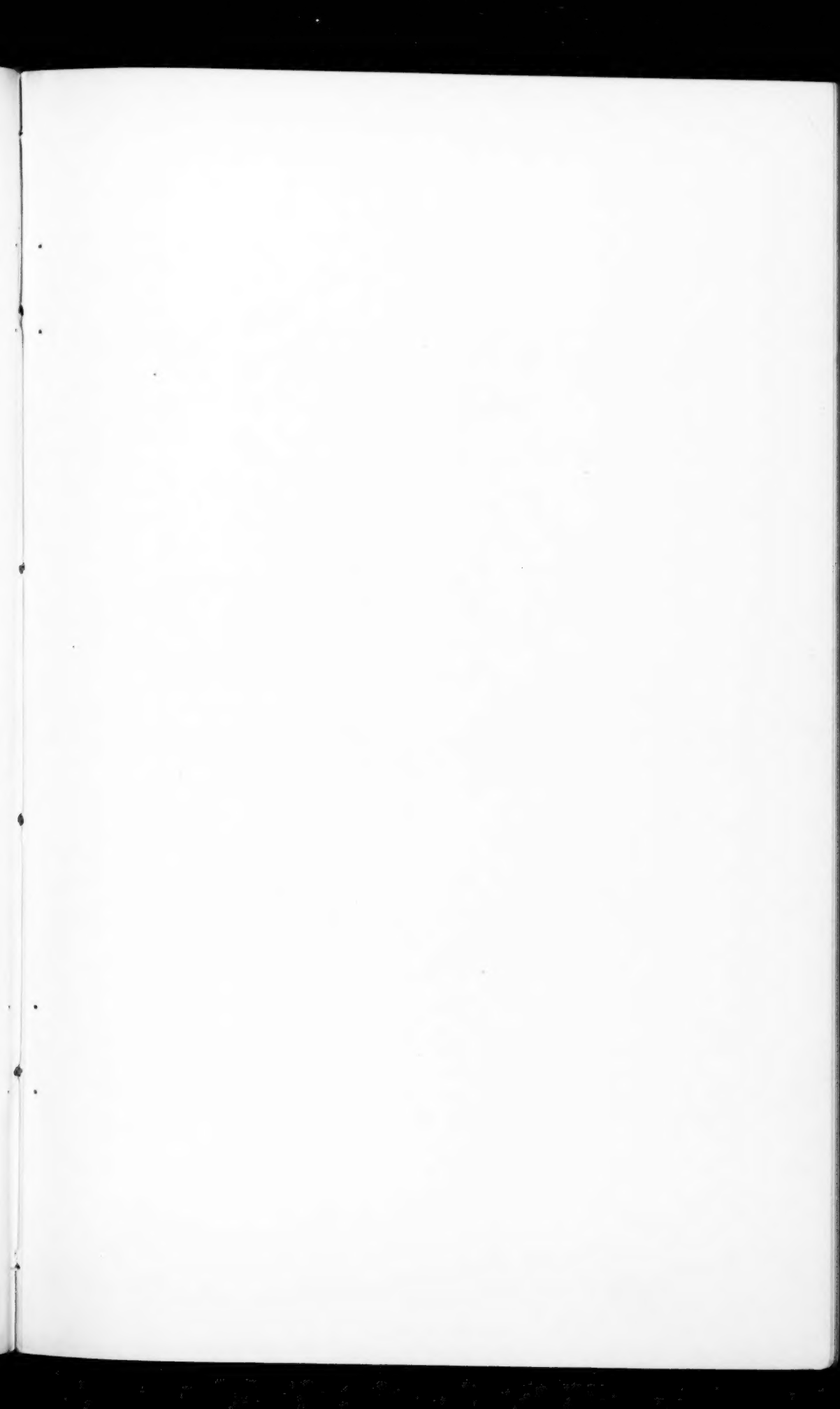




FIG. I.—Drawn from death mask of cystic adenoma of thyroid gland. Case 14729.
John Seely Hospital. Medical Dept. University of Texas.

ANATOMY OF A CASE OF CYSTIC ADENOMA OF THE THYROID GLAND.

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So seldom do we have the opportunity of making a complete dissection of a marked case of goitre that the writer feels no need to apologize for publishing the anatomic details of the following case and illustrating them by a complete series of figures.

The drawings were made from the body of a seemingly full-blooded negress, aged 55, case 14,729, John Sealy Hospital, said to have died of asthenia.

Fig. 1, showing the external appearance of the tumor, indicates the fat, well-developed character of the body. In the neck in the middle line and on either side of it, extending from the hyoid bone to the sternum, is a tumor which is so prominent on the right side as to rather obscure the evidence of swelling on the left. The sternomastoids are somewhat separated by the growth and overlap it at the sides. The tumor is globular and shows indications of lobulation. Its right half is roughly 7 c.m. broad and 8 c.m. long in its greatest diameters, while the left half does not lend itself readily to measurement. The right half of the tumor overlaps the middle line.

On dissection the skin was found to be freely movable throughout, the platysma on each side somewhat hypertrophied and the platysma muscles interlaced with each other below the hyoid. The anterior jugular veins were perfectly normal and did not seem to be enlarged. On reflecting the platysma the superficial layer of the fascia lata presented no peculiarity. It had the usual attachment to the hyoid bone, enclosed the sternomastoid on either side and split inferiorly as usual into two layers attached to the anterior and posterior lips of the upper border

of the sternum and between the layers was the usual vein uniting the two anterior jugulars.

Fig. 2 shows the deep fascia reflected to expose the first layer of infra hyoid muscles and sternomastoids. The right sternohyoid which covers the larger lobe of the tumor is very much hypertrophied, especially in its breadth, the muscle measuring 5.5 c.m. across at its broadest (about midway between the hyoid and sternum) and narrowing at either end. It is just about twice the size of the normal muscle. Both omohyoids are markedly hypertrophied, the left sternohyoid not so, but here I may be in error as the left side of the tumor was exposed in embalming the body and the coverings damaged. The tumor is seen to dip beneath the sternomastoid on either side. No large vessels are apparent. Between this layer of infrahyoid muscles is a distinct layer of fascia stretching between and splitting to enclose them. It is the normal layer of fascia which unites these muscles and can scarcely be said to be hypertrophied. Thus we have in it a second layer of deep fascia over the tumor.

In Fig. 3 the sternohyoids, and omohyoids have been reflected, their fascia removed with them. The anterior edge of each sternomastoid has been deeply incised and the muscle partly drawn aside. The tumor is now found to be enveloped in a third distinct and in this case somewhat hypertrophied layer of fascia into which the sternothyroid muscles are inserted. These muscles are much hypertrophied, being each 5 c.m. broad at its sternal attachment. Each muscle extends as a muscular belly for about 4 c.m. upward from the sternum and is then lost in the fascia. There is no trace of an attachment of muscle or fascia to the thyroid cartilage, the fascia seems to have been stripped off the thyroid cartilage and retains its attachment only to the hyoid bone. No large vessels are yet to be seen except at each upper and outer angle of the tumor, where the superior thyroid vessels can be made out enveloped in fascia. The fascia laterally blends with the sheath of the sternomastoid. On the right lateral surface of the right lobe of the tumor a deep groove divides it into two masses. In the upper end of the groove a small portion of the upper end of the right sternothyroid muscle will be found (see Fig. 5).

In Fig 4 the sternothyroid muscles and the fascia belonging to



FIG. 2.—First layer of muscles.

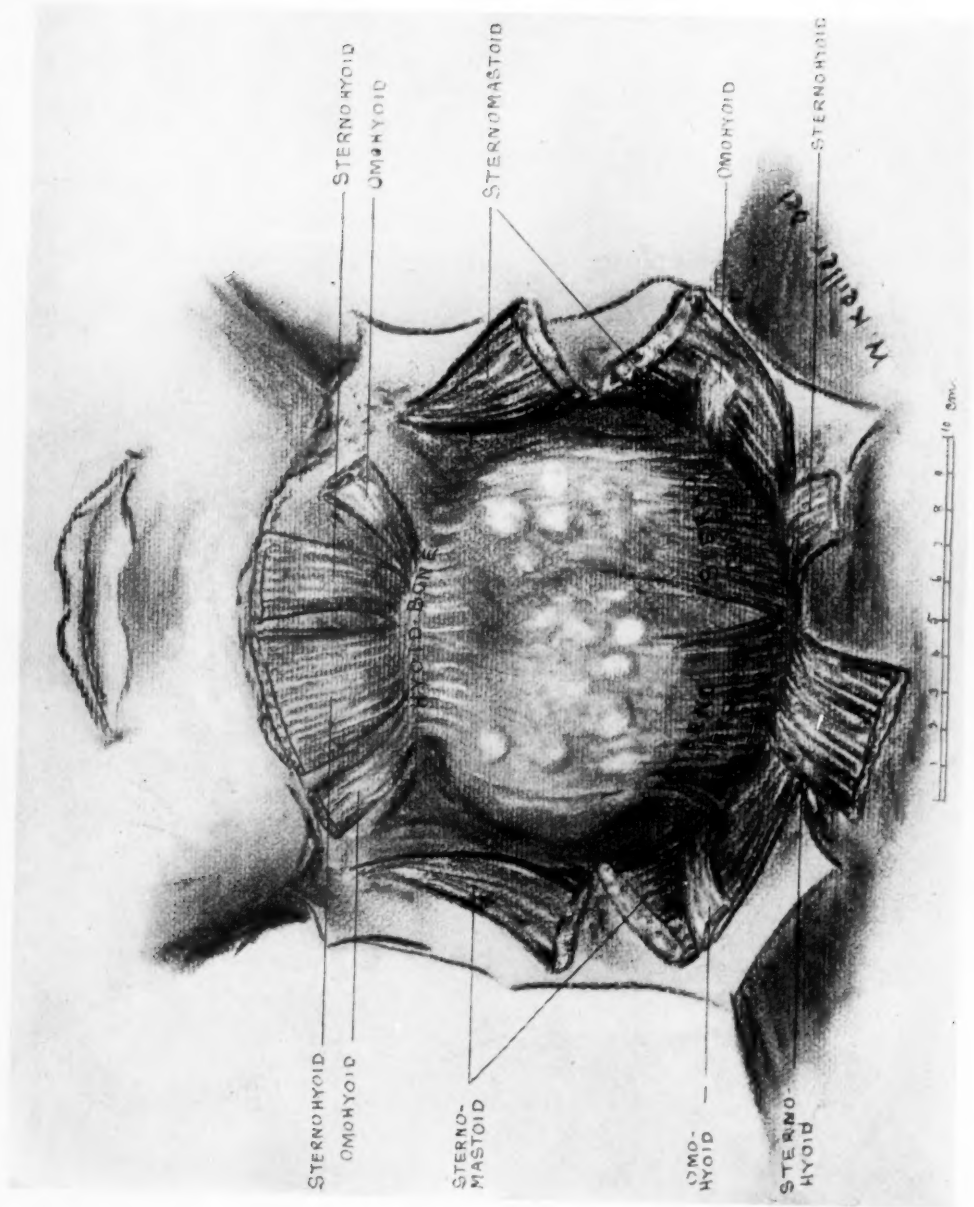


Fig. 3.—Second layer of muscles.

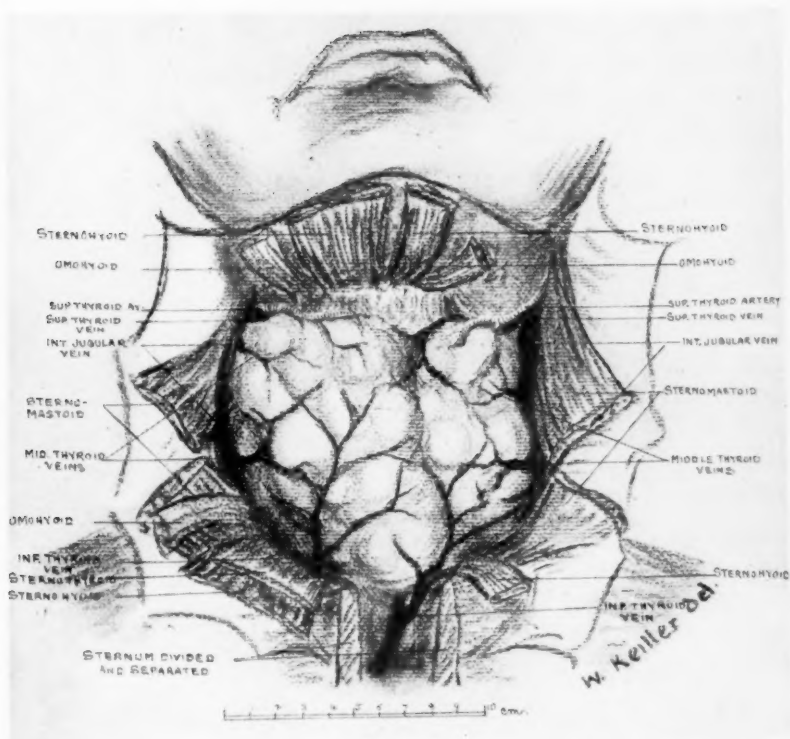


FIG. 4.—Muscles reflected. Capsule of tumor exposed.

them which were found to form a complete anterior investment for the tumor have been reflected and the proper capsule of the goitre has been exposed. The sternum has been cut longitudinally and the superior mediastinum opened the better to investigate the lower relations of the tumor. For the first time important vessels are encountered and the tumor, freed from its compressing investments, seems larger than in any previous stage of the dissection. The tumor is now seen to consist of a right and a left half, each further sub-divided and all enveloped in the same capsule. The right half of the tumor presents a posterior portion, elongated and shaped like an enlarged lateral lobe of the thyroid. It appears to be free from cysts and looks like simple adenomatous tissue (simple hypertrophy). All the rest of the right half and the whole of the left half of the tumor are markedly cystic, the globular prominences of the individual cysts being very numerous. The whole surface of the tumor is covered by a dense network of large veins whose size cannot rightly be estimated in their empty condition. They are imbedded in and almost inseparable from the capsule and the figure only gives a faint idea of the larger vessels. The internal jugular veins are pushed outward by the tumor mass, and each vein is as it were anchored to the capsule by three large branches, a superior thyroid vein at the upper angle of the mass (about the usual level of the vessel) and two middle thyroid veins, the lower of which is about at what should be the level of the cricoid cartilage, while the upper seems an accessory vein and lies at what should nearly correspond with the upper border of the thyroid cartilage. Rather deeply under cover of the sternum and springing from the inferior angles of each lateral lobe of the growth are two large inferior thyroid veins. These veins all anastomose freely over the surface of the growth and send great branches in between its lobes. Excepting the main trunks they are thin walled and imbedded in the capsule. The trunks of these veins are enlarged, suggesting in size average median or ulnar veins as they appear at the elbow. Enveloped in the capsule of the tumor at each upper lateral angle is the only artery so far met with, namely, the superior thyroid. It is accompanied by the superior thyroid vein and is distinctly enlarged. Each superior thyroid artery sends a branch over the surface of the tumor but

passes mainly to its deep aspect. Its relations are practically normal and it is easily accessible to ligature. Coursing over each lateral surface of the tumor is the *ansa hypoglossi*, which has been dissected out of the fibrous capsule belonging to the muscular layer.

In Fig. 5 the two halves of the tumor have been separated to show its deep relations. In incising the capsule along the line of division between the two halves of the tumor many veins required double ligation before being cut. This done, the two portions were separated so as to get at the deeper vessels. The superior thyroid arteries with companion veins were divided between ligatures on the side of the thyroid cartilage; the inferior thyroid arteries were ligated on the sides of the trachea. The relations and dimensions of the *isthmus thyroidei* unfortunately could not be made out with certainty, as it had been damaged in embalming the body. I think it was comparatively small (probably 1 to 1.5 c.m. in diameter) and firmly adherent to the first two rings of the trachea, a large branch of each inferior thyroid artery closely associated with it. The two segments of the goitre having been separated as in Fig. 5, the trachea and larynx are exposed. The tumor being bilateral there is no appreciable bending of the trachea, though there may be some slight narrowing. None of the rings are softened. A little separate cyst has remained attached to the front of the trachea in association with the right inferior thyroid vein. It is an accident of dissection and is not especially adherent. By fully retracting each half of the goitre the carotid sheath is exposed on either side. The vessels have been markedly displaced outward by the tumor. From under each carotid sheath 2 to 3 c.m. above the level of the sternum the trunk of each inferior thyroid artery is seen to emerge. Each artery divides into an ascending and descending branch, the latter going one to each lower angle of the goitre and joining there the corresponding inferior thyroid vein; while each ascending branch enters its own lobe close to the isthmus. The ascending branch of each inferior thyroid artery on the side of the trachea is in close relation to the recurrent laryngeal nerve, a point of the utmost surgical importance. The dissection shows that the inferior thyroid arteries might be ligated without danger to the recurrent laryngeal nerves either where they enter the

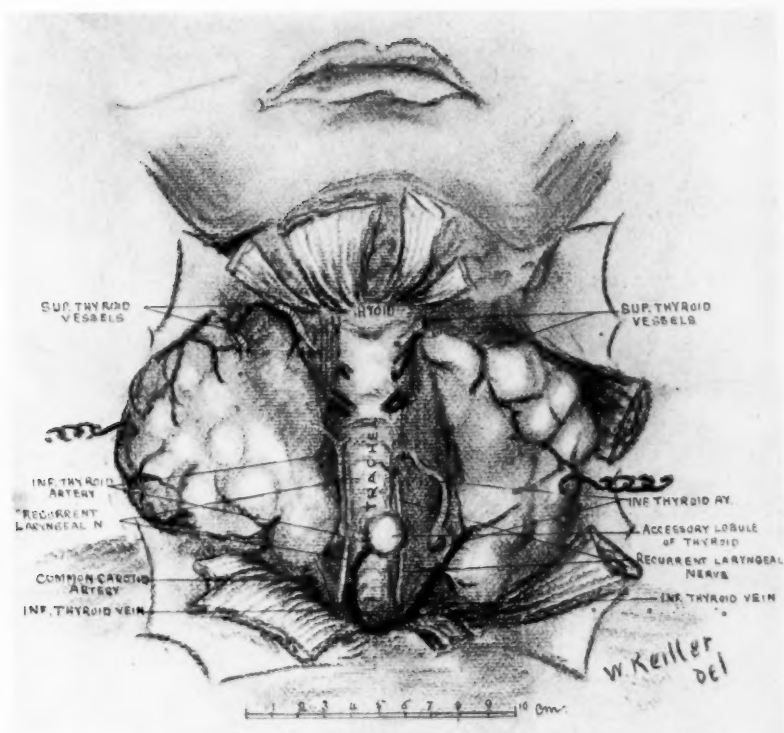


FIG. 5.—Tumor divided, trachea and vessels exposed.

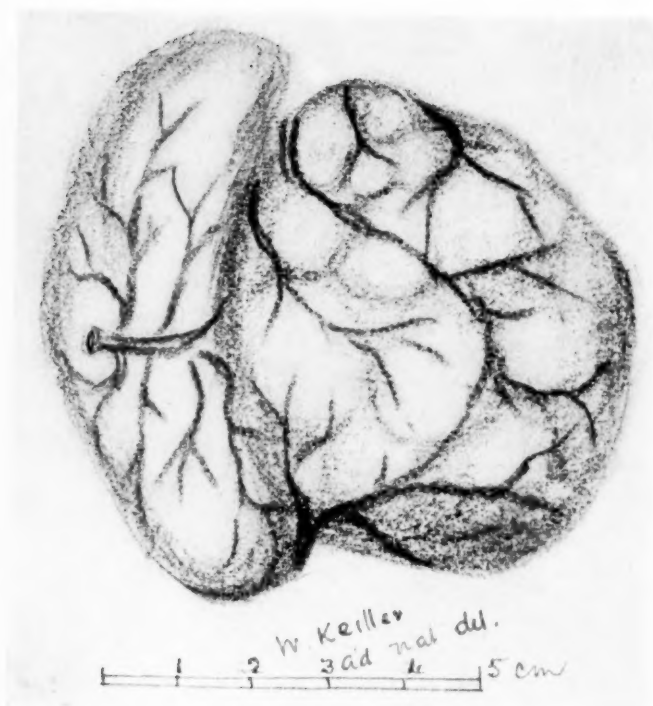


FIG. 6.—Outer surface of right lobe of hypertrophied thyroid.



FIG. 7.—Section of right lobe of cystic thyroid gland.

tumor at the antero-lateral borders of the trachea (and here there would be at least two large branches, an upper and a lower previously described, to be ligated for each inferior thyroid artery), or the trunk of each vessel might be safely ligated as it emerges from under the carotid sheath. The trunk of the sympathetic is not visible. Dissection shows that its close relationship to the carotid sheath in which it is imbedded has caused its displacement outward with the common carotid artery. The superior thyroid artery and companion veins are easily accessible to ligature, as they course over the upper angles of the tumor. I could find no thyroideal artery. Further dissection shows two large inferior thyroid veins, one opening into each innominate. Their trunks would be easily accessible, as the lower angle of each half of the growth is raised. The other veins are more accessible from the outer surface of the tumor as shown in Fig. 4.

It will be seen that there is a distinct difference in character between the deep and superficial portions of the right half of the tumor, the superficial part being a congeries of cysts, the deeper seemingly simply adenomatous. The section however shows that the deep portion of the tumor is also markedly cystic in its lower segment. A small upper part of the right sternothyroid is seen attached to the thyroid cartilage and reflected upward. It was found occupying the angle between the deep and superficial parts of the tumor superiorly and attached to the capsule formed from the fascia of the sternothyroid muscles (compare Fig. 4).

Fig. 6 is a drawing of the outer surface of the right lobe of the thyroid. The arrangement of one of the middle thyroid veins is well seen, of the superior and inferior thyroid veins, and also the difference in superficial appearance between the smooth posterior portion and markedly lobulated anterior portion of the growth. Fig. 7 shows that on section the difference is more apparent than real, the upper part of the posterior mass being the only portion free from cysts. The lower half of this portion of the tumor shows one large and many small cysts imbedded in a groundwork of simple adenomatous tissue; while the anterior part of the growth is one great mass of cysts with septa so thin as to be barely appreciable. All the vessels visible to the naked eye are in the capsule.

The left half of the tumor differs from the right half in presenting on its upper three-fourth an enormous number of smaller cysts, varying in size as seen by the naked eye from 2 m.m. to 3 c.m. in diameter. All these are evidently compound, each larger cyst being composed of many smaller ones whose capsules are thinning out toward obliteration, the capsule of the larger cyst being thickened. The lower fourth of this lobe has some normal gland in which are many small cysts. There were no post-esophageal or mediastinal extensions of the tumor. Microscopically the growth is a cystic adenoma of the thyroid gland.

The main points to be remembered in removing nonmalignant tumors of the thyroid body are:

(a) The danger from hemorrhage which is mainly venous, and constitutes one of the chief risks.

(b) The danger to the inferior laryngeal nerve.

(c) The danger of compressing the trachea or its collapse if its rings be softened.

(d) The danger of a peculiar postoperative toxemia probably from absorption of thyroid secretion, which is according to most operators greatly increased by much pressure on the tumor during its removal.

(e) The danger of myxedema if the whole gland be removed.

Bearing these points in mind the dissections in this case seem to me to teach the operator the following lessons:

Easy access is essential to safe and speedy removal and with this in view, I would use a V incision, the upper limbs of the V beginning at the anterior border of each sternomastoid a little below the level of the angle of the jaw when the head is thrown back, and following the anterior border of each muscle and meeting about one inch above the sternum in the middle line. In this incision skin and platysma should be cut, large branches which frequently unite the anterior jugulars with the external jugulars looked for under the platysma and divided between ligatures near the upper angles of the wound, the anterior jugulars themselves farther down, and the vein joining them just above the sternum. The next incision should

be exactly along the same lines, should cut the omohyoids and sternohyoids as far from their hyoid attachments as will admit of picking up the lower ends and reuniting them at the end of the operation.

The next sweep of the knife should take in the sternothyroids and the sheet of fascia which stretches between these and thence to the sternomastoid over the tumor (see Fig. 3). No large vessels should be encountered so far (except the anterior jugular veins and their connections). It might be possible with care to avoid the ansa hypoglossi supplying the hyoid depressors and thus preserve these muscles. The nerves should be found descending obliquely to the hyoid depressors over the carotid sheath in the upper two inches of the incision on either side. With the view to saving these nerves and also to avoid injury to the veins of the immediately underlying special capsule of the goitre I would start with careful division of the muscular belly of the sternothyroid above the sternum and follow the fascia up cautiously on either side. This last incision should enable the operator to throw up a flap consisting of all the hyoid depressors and the fascia connecting them which would fully expose the thyroid gland in its proper capsule. So far bleeding should have been easily controlled. The head should now be bent forward to relax any pressure on the veins which course over the goitre, and its general relations can be thoroughly examined to determine the extent and method of removal. Remembering the importance of avoiding pressure on the trachea and in the light of the dissection before us (Fig. 5) it would seem best to begin by dividing the veins and capsule between ligatures over the median dividing line between the right and left segments of the growth. No vein should be cut without being first ligatured, lest it retract within the capsule and be troublesome to catch again. Thus the two halves of the tumor could be separated, the trachea exposed, and the character and relation of the growth made out. In this case one would readily see the comparatively healthy character of the deep portion of the right half of the tumor, and the superficial cystic portion could be removed by ligature of the superior thyroid vessels at the upper and inner angle, of the upper branch of the inferior

thyroid artery in front of the trachea near the isthmus, of the inferior branch of the inferior thyroid artery and the inferior thyroid vein at the lower angle of the tumor well forward and out of the way of the recurrent laryngeal nerve. Turning the gland now to the inner side cautious division of branches of the middle thyroid veins between ligatures would enable the operator to remove the superficial cystic portion of the growth. Nothing should be cut except between ligatures.

My uncertainty about the isthmus in this case does not enable me to argue from this dissection; but the experience of surgeons would suggest the division of the isthmus between ligatures as a step to be taken as soon as that part is fully exposed. The general cystic condition of the left lobe, taken together with the comparatively healthy character of the deep portion of the right lobe which we have resolved to preserve, should determine the complete removal of the left half of the goitre. The inferior thyroid vein is ready of access and should be first ligated and cut at the lower angle of the tumor. Rolling the tumor gently outward the inferior thyroid artery will be readily and safely accessible as it emerges from under the carotid sheath, thus avoiding risk to the recurrent laryngeal nerve which is close to the trachea. The superior thyroid vessels can now be taken at the upper angle of the growth; and lastly, turning the mass toward the middle line the middle thyroid veins will be ligated and divided as far as possible from the internal jugular. The cysts which our section reveals at the lower angle of the part we have resolved to leave need not trouble us, as experience teaches that they are likely to atrophy after operation. In closing the wound the depressors of the hyoid bone should be stitched together to preserve their function, and the danger attending the absorption of the thyroid secretion, the risk of venous oozing, and the difficulty of complete obliteration of the postoperative cavity suggest the necessity of gauze drainage at the lower angle of the wound. Elevation of the lower end of the bed and avoidance of a pillow might lessen the risk of mediastinal infection.

THE RESULTS OF THE SURGICAL TREATMENT OF EXOPHTHALMIC GOITRE.¹

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IN a paper read before the American Surgical Association in 1903 (*ANNALS OF SURGERY*, 1903, xxxviii., p. 161) the writer reported the results of eighteen cases of exophthalmic goitre operated upon by him, and his present desire is to give later reports on some of these cases and to add three recent cases. It is perhaps worth mentioning that there has been an apparent increase in the opposition to surgical treatment although the results of non-operative measures have not improved very much in spite of the use of various serums and of the Röntgen ray. Both the latter methods, as well as Abbé's method of burying a tube containing radium in the gland, are on trial as yet, for it is too early to know how complete and how permanent the results may be. The arguments of some of the medical authorities seem hardly fair. Eulenburg (*Deutsche Klinik*, 1904, vi. 744), for instance, making the extraordinary statement that patients do not die of exophthalmic goitre, a statement which hardly needs contradiction. We readily acknowledge that the majority of cases yield to medical and hygienic measures if the circumstances of the patient admit of proper treatment being fully carried out. But these conditions often cannot be fulfilled and many cases also are severe and resist treatment obstinately even from the beginning.

In the writer's opinion surgery should be reserved for severe cases which have resisted medical treatment, but this does not mean that it should be undertaken as Eulenburg wishes as a last resort and forlorn hope, for there can be no doubt

¹ Read before the Pennsylvania State Medical Association, September 27, 1905.

that the mortality is greater in the bad cases than when the symptoms are slighter and the patient is in better condition. On the other hand we cannot advocate immediate and early operation in every case, because many recover with medical measures alone, and because there is a mortality to operations even in the comparatively light cases, although the risk is less than in the serious ones.

The only operations which need be considered are partial thyroidectomy, and extirpation of the cervical sympathetic nerve and ganglia. Ligature of the thyroid vessels has a palliative effect and is especially useful as a preliminary to thyroidectomy.

Sympathectomy was first advocated by Jonnesco (Balacescu, *Arch f. klin. Chir.* 1902, lvii. p. 59). Hoping to avoid the acute thyroid poisoning which had made the mortality of his thyroidectomies so high, the writer tried sympathectomy in seven cases, but met with the same ill-fortune, two deaths occurring from acute thyroidism and one from the anæsthetic. Full details of these cases are given in the paper already alluded to. Of the four patients who recovered, the following report is made up to the present time. The numbers are those of the previous paper.

CASE XII.—M. F., female, 25 years old. Operation, May 17, 1899; middle and inferior ganglia of the cervical sympathetic removed on both sides. May 5, 1904, five years after operation, she was examined just after recovery from an attack of grippe. Pulse 70 to 90 while in bed, and even when the temperature had been 104, the pulse only reached 100 to 108. Thyroid gland normal in size and consistency. The eyes were normal, pupils dilated. The heart was normal, without murmurs. She had no tremor, was not nervous, slept well and had been able to work.

CASE XIV.—M. B., female, 28 years old. Operation, December 2, 1902; all sympathetic ganglia removed from both sides of neck. Primary union followed by immediate improvement of all symptoms. October 11, 1903.—Thyroid gland enlarged again, median lobe as large as a hen's egg. Pulse 138. Coarse tremor of fingers. January, 1904.—Improved since last note until the present, but is suffering from an attack of grippe and is much

worse. March, 1904.—Very ill. When put to bed, pulse dropped to 60 and so remained, but with poor force. Ran a high fever, without leucocytosis, and died March 20. Autopsy revealed an acute endocarditis without other lesions of importance.

CASE XV.—E. F., female, 23 years old. Has had exophthalmic goitre for two years, and had thyroidectomy of right half performed about one year before, with temporary improvement, then relapsed. Extreme exophthalmos, pulse 110 to 150, very nervous, tremor, dyspnoea. Operation, December 2, 1902; all cervical ganglia of the left sympathetic removed; December 19.—Same operation on right side. Immediate improvement. September 11, 1905.—Is doing full work as chambermaid. Rides a bicycle. Sleeps and eats well. Neck smaller, measuring $11\frac{1}{2}$ inches. Pulse 120 while standing after walking. Eyes improved, left being no more noticeable than an ordinary myopic eye, right rather more prominent. No tremor or twitching; manner quiet; face does not flush.

CASE XVII.—L. W., female, 26 years old. Operation, January 17, 1903; all cervical sympathetic ganglia of both sides removed. May 11, 1903.—Neck measures $15\frac{3}{4}$ inches. Exophthalmos is less, can shut right eye completely, left eye almost, convergence normal, eyelids follow eyes downwards. Pulse 100. Feels well. February 13, 1904.—Her physician reported that patient has developed nephritis and a cardiac lesion, and has had œdema of the limbs for three to five weeks. The goitre has shrunk during this illness. Early death was expected.

Of these four cases, then, one relapsed within nine months, and a little over a year after the operation, she died of the original disease with an acute endocarditis. One case was completely cured five years after operation. One case was almost cured and still improving when she acquired nephritis about one year after the operation, and has probably since died. The remaining patient is able to do her work and enjoy life without medication, although goitre, exophthalmos, and slight tachycardia persist—a practical cure. We may safely conclude that the ultimate results of sympathectomy are fairly satisfactory. But the operation is much more difficult than thyroidectomy, not so easily done with local anæsthesia,

and the mortality is fully as high. Moreover, the scars come so high up that they are more disfiguring, by no means an unimportant factor, as the patient's employment often depends upon her appearance. For these reasons the writer has again turned his attention to thyroidectomy.

Three new cases have to be reported here.

CASE XIX.—Fanny C., single; United States; 28 years old; teacher. Was first seen by me in May, 1903, and her condition was so serious that I insisted on several months of rest and medical treatment before operating. October 19, 1903, she was admitted to St. Luke's Hospital in much better condition. Menstruation had been irregular and scanty. Nine years previously she had first noticed a swelling in the median line of the neck, which had gradually increased and for the last three years had interfered somewhat with swallowing. No nervous symptoms or dyspnoea at present. Slight exophthalmos. Eyelid follows eye in looking down. Thyroid gland considerably enlarged, with expansile pulsation, and with a murmur to be heard all over it. The largest circumference of the neck is $14\frac{1}{2}$ inches. The strong pulsation of the heart is visible all over the præcordium. There is no hypertrophy. A loud systolic murmur is heard, especially at the apex. Lungs, examination negative. There is a fine tremor of the fingers. Pulse 84 to 120. Operation, October 20, 1903. Cocaine local anæsthesia. Ligation of right inferior thyroid artery. Cervical sympathetic nerve divided near second ganglion. Wound sutured and drained. Pulse 100. October 21.—Pulse 124, and temperature 104° at the highest. The right pupil is contracted, there is slight ptosis of the right lid, and that side of the face is flushed. The pulse reached 100, and the temperature was normal, on the fourth day. Primary union was obtained, the drain sinus being closed by the 26th. October 28.—Operation. Right superior thyroid artery ligated under local anæsthesia. There was but little febrile reaction and primary union was obtained. November 6, the goitre was smaller, the pulse lower, and the nervousness gone. December 6, 1903.—Pulse 84 to 120. Greatest circumference of neck $13\frac{5}{8}$ inches. December 7.—Operation. Left inferior thyroid artery ligated under local anæsthesia. The pulse was 132 and the temperature 102° at the highest, and became normal in

three days. December 14.—Operation. Left superior thyroid artery ligated under local anæsthesia. After slight reaction the pulse and temperature became normal in three days. Primary union was obtained in both wounds, although a hematoma formed in the second. She continued to improve, but I advised thyroidectomy to guard against a relapse.

March 21, 1904, she was readmitted to St. Luke's Hospital. The pulse was 80 to 100, rising to 120 on exertion. April 1, 1904.—Operation. The right half of the thyroid gland was removed, by an oblique incision following the other scars. The skin was incised with local anæsthesia, and the operation begun. But there was very troublesome venous oozing, requiring the actual cautery to check it, and the parts were so sensitive as to make deep dissection very painful, and chloroform was administered. This was well borne, the pulse being only 116 at the end. The wound was sutured and drained. Eight hours later the temperature rose to 102° and the pulse to 140. The following day the pulse was 150 and the temperature 101³/₅ at the highest. The urine, always previously normal, contained one per cent. of albumin. There was restlessness and nausea. Primary union was obtained. April 28.—The pulse is 100 while standing after walking. Greatest circumference of neck is 12 inches. No tremor. Sleeps and eats well. September 20, 1905 (about eighteen months later), she reports that she is feeling perfectly well and is going on with her work. Pulse 70. Menstruation regular during last year. Has married and lost her husband in the past year.

CASE XX.—Annie C., 28 years old; single; born in United States. When first seen was in poor condition and was treated by her physician for three weeks with rest, icebag to the heart, aconite diet, etc., with considerable improvement. April 19, 1905, admitted to the General Memorial Hospital. She had always been nervous. Menstruation regular, formerly profuse, latterly less so. For last year has been very nervous and has had severe frontal headache. Neck has increased in size. She has had pronounced tremor and twitching of the extremities and palpitation of the heart. Pulse now 105 to 112. (When first seen was 130). No albumin in urine. The exophthalmos is slight, the enlargement of the thyroid moderate. The patient is extremely nervous, and the tremor very well marked.

Operation, April 20, 1905.—Cocaine anæsthesia was tried, but patient was hyperæsthetic and absolutely uncontrollable, trembling and twitching, yet eager to have the operation carried out. Chloroform had to be administered after the skin had been incised, and the operation was rapidly completed, the right half of the thyroid gland being removed. The wound was sutured and drained. The patient was somewhat cyanotic and the pulse was 145, respiration 44, and temperature 101° when she was put to bed. About eight hours after the temperature had reached $102\frac{3}{5}^{\circ}$. At noon next day the pulse was said to have been 230, respiration 58, and patient was thought to be dying, but rallied and was able to talk and acted rationally all the afternoon. The temperature, however, rose to 104° , the pulse running 144 to 165; the respiration became more labored, and she died about forty hours after the operation. Albumin and hyaline casts were found in the urine after operation.

CASE XXI.—Maud W., 24 years old; single; born in United States. Admitted to General Memorial Hospital April 11, 1905. Menstruation regular. Had nervous prostration for three months, two years ago. Four years ago throat began to enlarge and has steadily increased in size. Now the greatest circumference is $14\frac{1}{2}$ inches. Four months later became nervous and exophthalmos began, increasing ever since. In last two years has grown less nervous. Since her neck swelled, has had moderate dyspnoea on exertion, and mild palpitation of the heart. Sleeps well. Has several times had attacks of great nervousness and restlessness with high fever. Pulse 110 to 130. Heart apex beat normal, with marked pulsation of præcordium. Reduplication of valve sounds and confused indefinite murmurs. Systolic murmurs in both carotids. No thrill. There is extreme exophthalmos, so that the lids do not close by a space of one quarter of an inch, and do not follow the eyes in looking down. There is moderate nervousness, patient having good self-control. Slight tremor of fingers. Moderate enlargement of the thyroid gland. Two weeks were spent in preliminary treatment in bed with icebag to heart, bromides, aconite, and limited diet (no red meat). Operation, April 25, 1905. Under cocaine anæsthesia, the right superior thyroid artery was ligated. Wound sutured without drainage. The temperature rose to $102\frac{3}{5}$, pulse 134, next day, and was three

days in falling to normal, but primary union followed, with immediate though slight improvement in the patient's subjective symptoms, especially the loss of strained feeling in the eyes. May 1 she could close the eyelids completely. Pulse 90 to 100. May 5, 1905, operation. Under cocaine anæsthesia the right half of the thyroid gland was removed. The parts were very sensitive, requiring much cocaine, but the patient was very courageous and patient. The wound was sutured and drained. There was a marked febrile reaction, temperature 102° and pulse 134, with gradual fall to normal. Primary union was obtained except in the drain-sinus, which discharged a sticky serum abundantly and was still open when patient was discharged two weeks later. All symptoms were immediately improved. September 8, 1905, she writes that she considers herself well. Pulse 72-84. No dyspnoea. Eyes less prominent. Sleeps well. Still has slight tremor of fingers.

The previous paper contained a study of the condition of acute thyroidism, which has been the cause of death in almost all my fatal cases. Acute thyroidism is marked by a rise of temperature with exacerbation of all the ordinary symptoms of the disease. In all six fatal cases there was albuminuria also, but in only two of these was it present before operation. If found, albuminuria would furnish a strong reason for declining operation. One case of thyroidism which recovered had albuminuria. The cause of this condition is not yet definitely known. The most popular theory ascribes it to absorption of the thyroid material from the wound, but this explanation is altogether too crude to be acceptable. In the first place, attacks of acute thyroidism are seen in the usual course of the disease when the patient is leading an ordinary life, or under general treatment only, without any local measures.

Secondly, any nervous excitement, a fright, anxiety, even ordinary business worry will often bring on an attack. If there is a history of such attacks as in Case XXI, especial precautions are necessary in undertaking surgical treatment. In one of my cases the symptoms set in a couple of hours before the time appointed for operation and the latter was

postponed. It cannot be claimed that in this case the crisis was due to rough handling of the gland during the usual antiseptic preparation of the neck, for the latter had taken place over twelve hours before. Fatal thyroidism followed the operation in this case.

Thirdly, the symptoms are seen just as frequently after sympathectomy as after thyroidectomy, and also after operations done on distant parts of the body in patients with exophthalmic goitre; for instance, ovariectomy (two cases), appendectomy, amputation of the breast, tonsillotomy, uterine curettage, tooth extraction. (See Sanderson, *Amer. Medicine*, 1905, ix. p. 197, and Mayo, *Medical Record*, November 5, 1904.

The so-called aseptic fever following operations without infection, or with so little infection that primary healing of the wound is not prevented, a fever which in the ordinary individual produces very slight disturbance, might very well be much more serious in persons with exophthalmic goitre, and this suggests a partial explanation. In a study of aseptic fever some years since (*Medical News*, June 24, 1899) the writer suggested the possibility of operative shock causing a rise of temperature like aseptic fever under some circumstances, and he believes that there is an element of shock in acute thyroidism. The causes of acute thyroidism are probably complex and include the nervous strain of undergoing an operation, the disturbing effects of general anæsthesia on various functions of the body, the shock of the operation itself, and the absorption from the wound of toxic materials—quite as much as the chemical bodies produced by minimal septic infection as the products of the thyroid gland.

In the former paper the conclusion was reached that general anæsthesia was to be avoided, and shock reduced by every means possible in order to escape acute thyroidism. In the three recent cases this was attempted by employing cocaine anæsthesia, and by dividing the operation into several sittings. In two cases this produced excellent results; in the third general anæsthesia had to be employed, and although chloroform was used, acute thyroidism promptly followed, and death ensued. If chloroform had been administered to the last patient, and

a thyroidectomy done without preliminary ligation, it seems certain that death would have resulted, for even the comparatively slight operation of ligation of the superior thyroid artery under cocaine anæsthesia was followed by severe febrile reaction.

Experience thus favors the earlier conclusions. In addition to the advice to divide the operation by performing preliminary ligation of the arteries, and to use local anæsthesia, I would now add that it is advantageous if not absolutely necessary to have the preliminary treatment by rest in bed, icebag to heart, bromides, etc., carried out at the hospital where the operation is to be done, in order that the patient may learn to know and trust the surgeon, and to like the nurses, growing familiar with her surroundings. This adds greatly to the efficiency of the control of the patient under local anæsthesia.

Reviewing the results of thyroidectomy, we have in all fourteen cases with four deaths, all from acute thyroidism. In addition to the two recovered cases just reported, final reports on the cases in the former paper are as follows:

CASE I.—L. E., 24 years; female. Operation November 11, 1893; right half of thyroid removed. September 1905, twelve years after, continues well. Pulse 80, eyes still somewhat prominent, no tremor or palpitation. Is running a millinery business.

CASE III.—S. B. H., female; 43 years. Operation October 2, 1894; right half of thyroid removed. September 1899, five years after, has been doing hard work and feels well. Nervousness almost gone. Pulse 100. Eyes still prominent but much improved.

CASE IV.—A. B., female; 21 years. Operation November 29, 1895; left half of thyroid removed. Six months later patient was perfectly well, the pulse being 74; no nervousness or insomnia (Booth).

CASE V.—N. C., female; 17 years. Operation December 17, 1895; right lobe of thyroid removed. 1902, seven years later, no nervousness, palpitation or exophthalmos, pulse 90.

CASE VI.—A T., female; 35 years. Operation January 11, 1896; left half of thyroid removed. 1898, two years after operation all nervous symptoms had disappeared, pulse was 84.

CASE VII.—R. W., female, 27 years. Operation October 13, 1897; right lobe and upper half of left lobe of thyroid removed. Immediate improvement, pulse 98, but patient has not been seen since.

CASE IX.—M. C. C., female; 18 years. Operation January 28, 1897; right half of thyroid removed. Improved, but relapsed. January 12, 1899.—Left superior thyroid artery ligated. Improved. In 1902 the improvement continued, but lately she has relapsed and now has severe symptoms (1905).

CASE X.—M. E. McK., female; 36 years. Operation November 13, 1897; left half of thyroid removed. April, 1902, was practically cured, less nervous, no tremor, eyes hardly noticeable, pulse 80 to 90, and was working hard as a bookkeeper. September, 1905, she continues well.

Of the ten patients who recovered from operation, one was improved but has not been seen since. One case was improved for two years, relapsed, later had one artery tied on the other side with improvement and again relapsed. Eight cases can be claimed as practically cured, having been followed six months (two cases), eighteen months, two years, five years, seven years, eight years, and twelve years. Two of the cases were slight, but the rest were serious and some in a dangerous condition. The four patients who died were all advanced cases. These results are encouraging, and partial thyroidectomy has apparently yielded better results than sympathectomy. But in one of my cases the latter has effected a practical cure after a relapse following thyroidectomy. On the other hand a relapse with fresh enlargement of the thyroid occurred in one case after sympathectomy, and perhaps a thyroidectomy would have brought about a cure here if we had been able to get the patient's consent. A temporary improvement was obtained in one of the relapsed cases by ligation of one artery on the other side, the improvement lasting two years or more.

This question of the proper treatment of relapsed cases is very interesting. Schulz (*Beitraege zur klinische Chirurgie* xxx. p. 638, 1901) had three cases relapse out of twenty treated by partial thyroidectomy, and operated a second time upon

the remaining portion of the gland, obtaining two cures. The other patient relapsed again and he was persuading her to submit to a third operation, as in his first operation he had merely shelled out a nodule, without actually resecting the gland. He states that in every case of relapse the remaining portions of the gland have undergone further enlargement. This continued growth of the gland also occurred in my two relapsed cases, and it seems to indicate that another partial thyroidectomy would be the proper treatment, provided that enough thyroid could be left to prevent cachexia strumipriva. If the patient upon whom I did a sympathectomy for a relapse following thyroidectomy remains as well as she is now (nearly three years after operation) we might suggest sympathectomy as an alternative when thyroidectomy was not considered wise.

The effect of the operation upon the various symptoms is interesting.

Eyes.—The exophthalmos is generally immediately lessened, but seldom entirely disappears. There may be a hypertrophy of the connective tissue of the orbit in long standing cases which is never entirely reabsorbed. But even when the exophthalmos continues the patients are at once relieved of the strained feeling of which they generally complain and the expression is less staring. The eyelids can be completely closed and they follow the eyeball properly in looking down.

Thyroid Gland.—In successful cases the remaining part of the gland is stationary or even diminishes in size. A relapse is accompanied and sometimes preceded by an enlargement of this remainder.

Circulation.—The pulse generally responds early, being reduced in frequency, and gaining in regularity and force as soon as the post-operative reaction has passed. In Case VI the pulse fell from 120 to 90 during the operation, becoming more rapid again, while the febrile reaction lasted, then falling permanently below 90. But in many cases the tachycardia persists, the pulse running 90 to 100 at rest and even reaching 120 on exertion, yet the patients feel so much relieved of the former tumultuous and irregular heart action that they consider themselves perfectly well and go about their regular lives without medication.

Nervous System.—There is an immediate improvement in the tremor, nervousness, excitability and insomnia, with a complete loss of the feeling of anxiety so common in this disease. The patient often notices this effect and speaks of it even on the day after operation, although it is not marked generally until after the postoperative reaction has subsided.

An indiscriminate collection of cases from literature would not give an accurate picture of the results obtainable by operation. But we can combine the figures of Schulz,¹ Kocher,² Mayo,³ and Hartley⁴ with my cases, making a total of 136 cases treated by thyroidectomy, with 17 deaths, chiefly from acute thyroidism. Four relapses are noted in this list, and several cases were lost sight of early. (Mayo gives no data to allow of proper classification of his cases) but there appear to be over one hundred cases cured, or practically cured. It has been said that the operative successes represent the periods of temporary improvement so often seen in exophthalmic goitre with or without treatment. But so many of the patients in these lists have been followed for several years and have continued well without any treatment whatever, doing their ordinary work, and sometimes very hard work, that this theoretical explanation of the results is absolutely untenable. Whatever the danger of operation may ultimately be shown to be, even if it should continue with a mortality of twelve per cent. or more, there can be no doubt that nearly all of the survivors will be cured of their symptoms, and it will probably be long before any internal treatment will be able to show such results in advanced cases of this most distressing disease.

¹ Loc. cit. ² *Mitth. a.d. Grenzgebiete*, 1902, ix. ³ Loc. cit. ⁴ *ANNALS OF SURGERY*, July, 1905, p. 33.

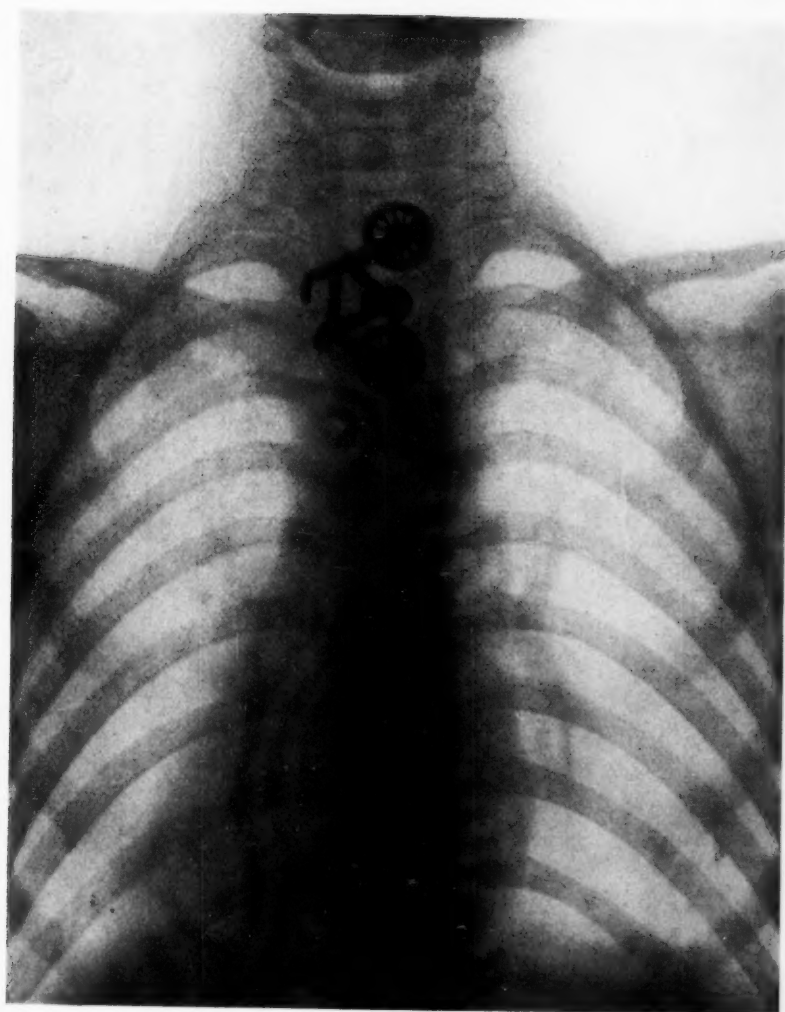


FIG. 1.

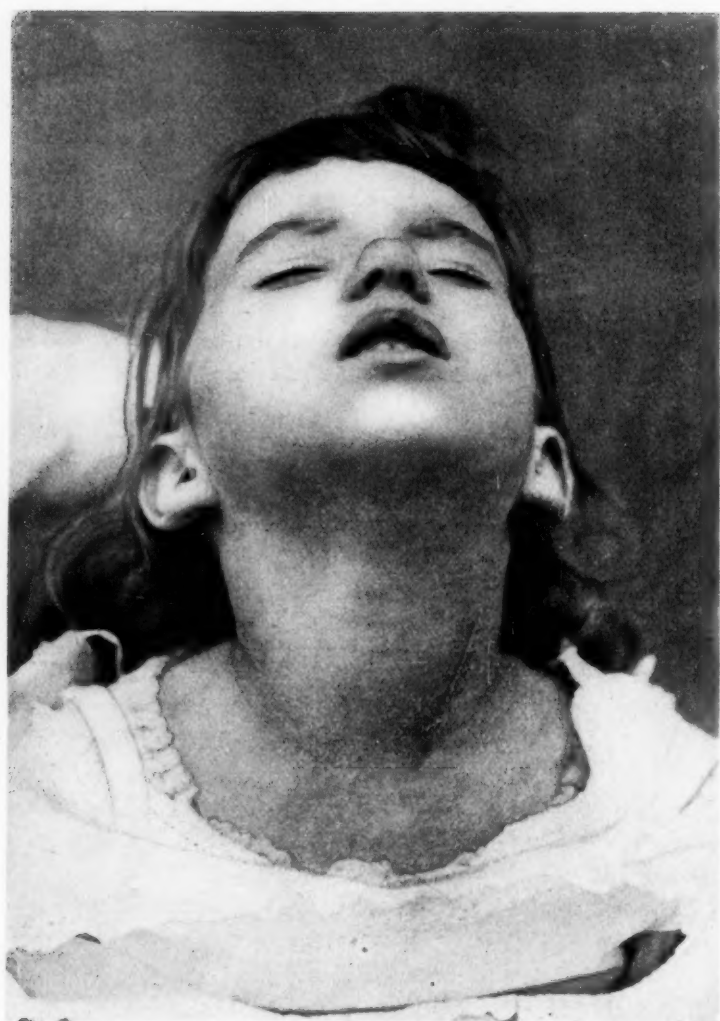


FIG. 2

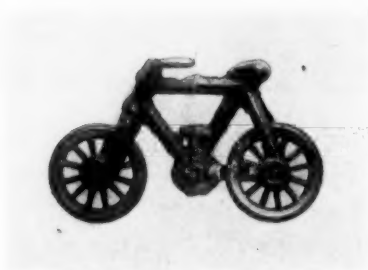


FIG. 3.

IMPACTION OF A TOY BICYCLE IN THE ŒSOPHAGUS; SUCCESSFUL REMOVAL BY ŒSOPHAGOTOMY.

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OF LONDON,

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MOST operating surgeons are called upon at one time or another to remove some quaint foreign body introduced into one of the various orifices of the human anatomy. Every textbook on Surgery contains records of such articles which had been safely extracted from the rectum, vagina, urethra, etc. The "Bust of Napoleon" unearthed from the rectum and the "Pomatum Pot" from the vagina are classical. The foreign body introduced in this case was a leaden model of the ordinary form of up-to-date safety bicycle.

In August, 1905, a little girl aged 4 was brought up to the London Hospital by her mother with the following history:—On the previous day the child had swallowed a small toy metal bicycle, which she was holding in her mouth. Since then she had had frequent attacks of severe retching and had been unable to take any food.

Shortly after her admission a radiograph of the thorax was taken and the bicycle was clearly shown.

It was evidently impacted in the œsophagus at the upper part of its thoracic course. (*Vide* radiograph 1.)

A bougie was passed down and an obstruction was met with some seven inches from the teeth.

An external examination of the neck was negative. An anæsthetic was administered and prolonged attempts at extraction were made by instruments passed through the mouth. Various forceps and coin-catchers were tried, without success.

On the next day the child was again anæsthetized and the thorax examined by an X-ray screen. The bicycle was seen to

be in its original position. The operation of œsophagotomy was then performed in the usual way.

When the œsophagus was opened it was found that the rim of the upper wheel could be easily seen just below the lower extremity of the wound in the œsophageal wall. The bicycle was extracted with some difficulty, as the handles were fixed in the wall of the œsophagus and these had to be cut off before removal could be accomplished.

The wound in the œsophagus was then closed by two rows of fine catgut sutures. The skin wound was partially closed and free drainage provided.

For three days after the operation there was some swelling of the neck and daily rise of temperature.

Discharge of saliva and some food contents came away through the wound during the first week, although feeding was carried out entirely through an œsophageal tube. This discharge ceased after a week and the drainage tube was dispensed with on the tenth day.

The further progress of the case was uneventful. The child left the hospital able to take ordinary food without any difficulty.

The accompanying photograph (2) was taken three weeks after the operation.

OVERLAPPING THE APONEUROSES IN THE CLOSURE OF WOUNDS OF THE ABDOMINAL WALL—INCLUDING UMBILICAL, VENTRAL AND INGUINAL HERNIÆ.

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My experience with the method of overlapping the aponeuroses in the closure of wounds of the abdominal wall has given such admirable results in the prevention of post-operative hernia that since 1896 I have been an enthusiastic advocate of this method of closure as applied to all wounds of the abdominal wall no matter what their location, provided drainage was not employed. As at the present time the use of this method of closure of abdominal wounds is becoming more general, it may prove of interest if I give the development of the method in my own practice and also in the hands of others.

An article by Dr. Kenelm Winslow appearing in the February, 1904, number of the *ANNALS OF SURGERY*, entitled "The Aponeuroses the Supporting Structures of the Abdominal Wall; their Approximation for the Prevention and Cure of Herniæ," has stimulated me to write this paper, although pressure of other duties has delayed its appearance. After discussing the employment of the principle of overlapping the aponeuroses in the cure of hernia, Winslow advocates, as a novel proposition, the adoption of the same principle as a routine procedure in the closure of ordinary celiotomy wounds, which theoretically he states should lead to improved results. This article shows that all general surgeons are not informed concerning the development of the operation of overlapping the aponeuroses in the closure of wounds of the abdominal wall and the results secured by it and indicates that an additional contribution to the subject may be of real value at this time.

Prior to May, 1892, I had employed the through-and-through silkworm-gut suture in the closure of celiotomy wounds. The high percentage of hernia following this method, especially in fat women, led me to abandon the method in favor of the tier suture. Following the principle of Schede of Hamburg¹ and Edebohls, I adopted the use of the buried permanent suture. Schede began the use of the buried silver-wire suture in May, 1887, more especially in the cure of large herniæ. The general surgical and the gynecological departments of the Johns Hopkins Hospital also had made extensive use of silver wire as a buried permanent suture. Edebohls² first employed silkworm-gut as a permanent buried suture in June, 1891, in the cure of a large umbilical hernia, and in May, 1892, he adopted the tier suture as a routine procedure, burying one row of silkworm-gut at the plane of the aponeurosis and then closing the skin and fat with a superficial row. I adopted Edebohls' technique and used it with but few changes until the end of 1896 for all wounds of the abdominal wall, including the Alexander operation, inguinal hernia and nephrorrhaphy. The changes consisted in substituting light for heavy silkworm-gut and in closing the subcutaneous fat and skin with catgut. The results secured by this method were eminently satisfactory as to primary wound healing, the prevention of hernia, and the absence of late irritation from the buried sutures, none of which gave trouble.^{3, 4}

In spite of this satisfactory experience, several considerations induced me to abandon the Edebohls technique and to devise the method of overlapping the aponeuroses as a routine operation. These considerations were: First, the advantages of closing the peritoneum with a running catgut suture; second, the advantages of a mattress suture in relieving tension; and third, that by special preparation of the aponeuroses and the overlapping of these structures a surface to surface union of the aponeuroses could be substituted for an edge to edge union, which promised to add materially to the strength of the resulting cicatrix. The advantages of the mattress suture and the overlapping of the aponeuroses first became apparent to me in operating for a large umbilical hernia in a stout woman April 7, 1894. Mattress sutures were intro-

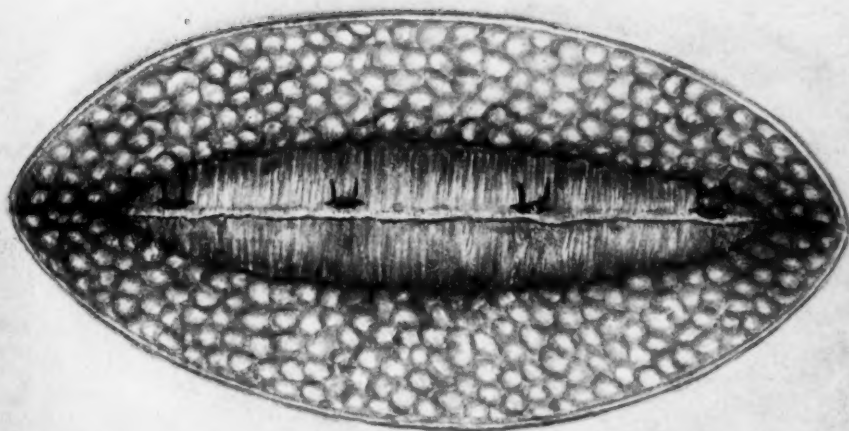
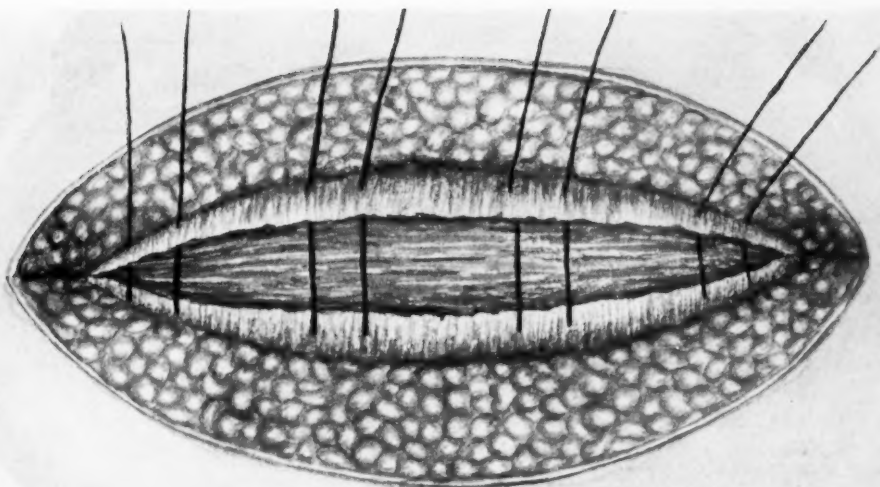


FIG. 1.—Modified mattress suture for closing the aponeurosis with silkworm gut.

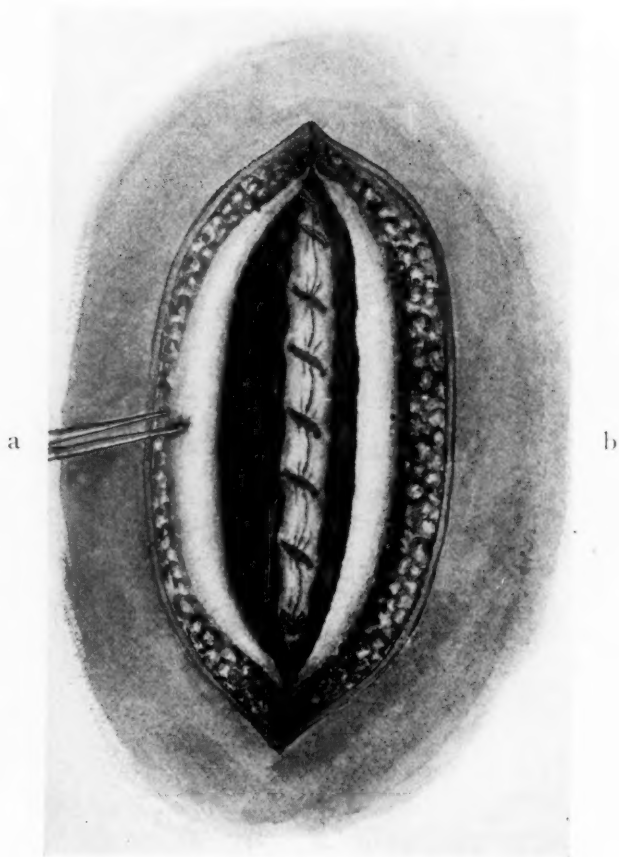


FIG. 2.—Closing the abdominal wound.—1. Suture of the peritoneum with a fine running cumol catgut suture; 2. Preparation of the aponeurosis for suturing. (a) Separation of the right aponeurosis from the rectus muscle. (b) Dissection of fat from the left aponeurosis.

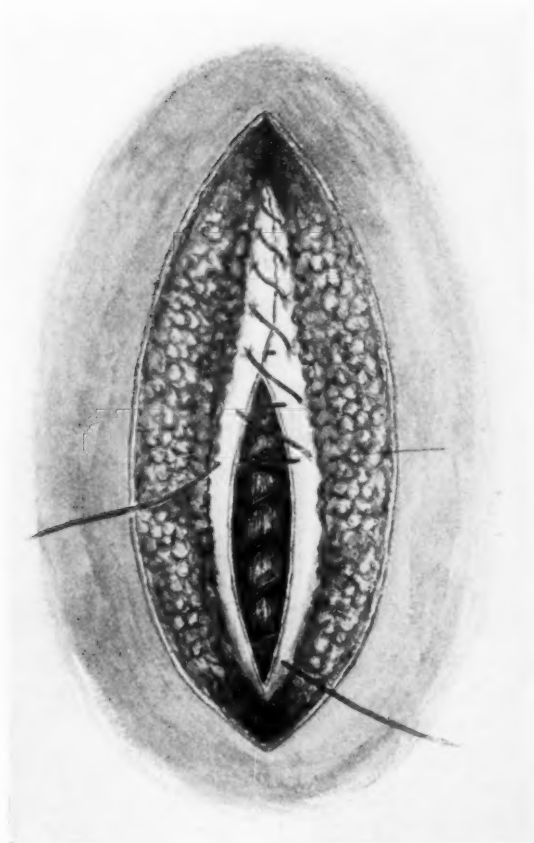


FIG. 3.—Closure of the wound in the aponeuroses of the oblique muscles. Overlapping the aponeuroses by superimposing that of the right side of the wound upon that of the left, and suturing with a continuous chromicized catgut suture.

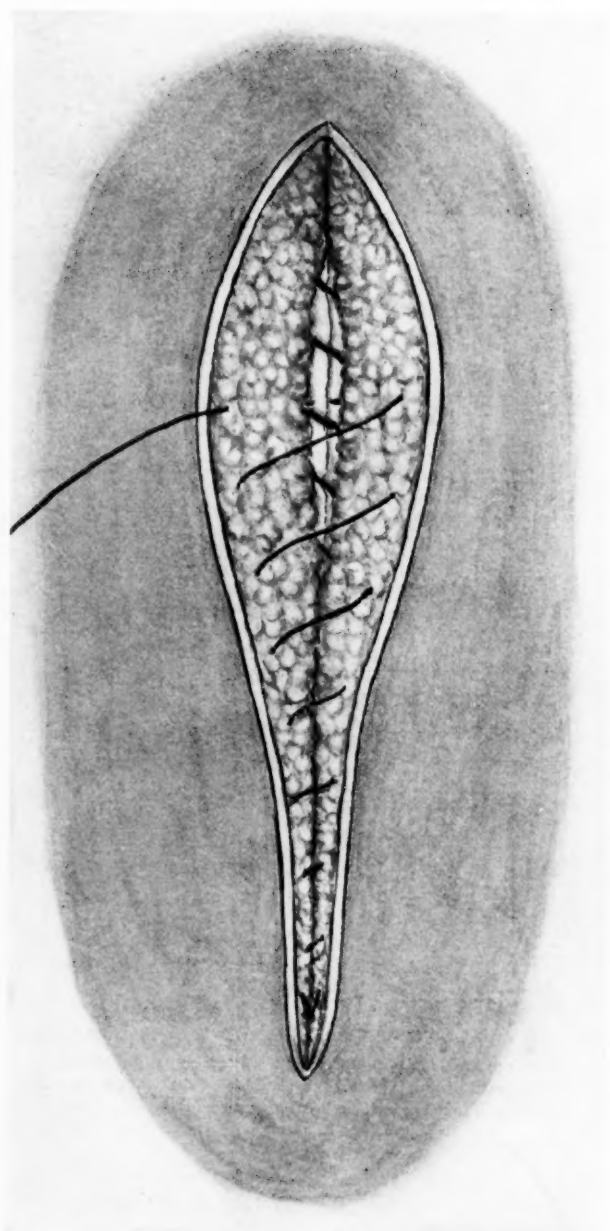


FIG. 4.—Suture of superficial fascia and fat layer.

duced primarily for the purpose of taking off tension from those introduced in accordance with the Edebohls technique, but it was evident to me that an additional advantage was gained in the extent of surface of the aponeuroses which was brought into apposition. The method was used occasionally from that date until it was adopted as a routine procedure at the end of 1896, especially in cases in which considerable tension was to be overcome.

It is now so generally accepted that the chief strength of the abdominal wall as a supporting structure depends upon the aponeuroses that we will not take time in demonstrating this proposition. It is equally accepted that the chief cause of post-operative ventral hernia is defective union of the aponeuroses, leading to separation of the edges of the aponeuroses and the development of hernia. The question which presented itself to my mind was whether an improvement could be made in securing aponeurotic union over that obtained by the methods in use in 1896. I had used the tier suture after the Edebohls technique with interrupted silkworm-gut suture, and was familiar with his later technique involving the use of the continuous catgut suture.⁵ It was clear to me that the aponeurotic union secured by these methods consisted in a scar of about one line in thickness between the divided edges of the aponeuroses, provided accurate union throughout the length of the wound was secured. It seemed to me that a much stronger union could be obtained by substituting a surface to surface union for an edge to edge union, therefore the method was devised⁴ and after various changes is now carried out as follows for celiotomy wounds:

The incision in the hypogastrium for operations on the female pelvic organs may be taken as the type. This incision is made by choice through the inner border of the right rectus muscle. In closing the wound the peritoneum is first closed with a continuous suture of fine cumol catgut. The fat is then dissected from the upper surface of the aponeurosis of the transverse muscles on the left side of the wound from one-third to one-half inch. The aponeurosis upon the right side of the wound is then separated for an equal distance from the rectus muscle. The muscles and fasciæ are then sutured

by means of a medium weight chromicized catgut suture in the following manner: The suturing is begun at the lower angle of the wound upon the left side. The suture is passed from above downward through the aponeurosis and rectus muscle. Then the separated bundles of the rectus muscle are united with a continuous suture until the upper angle of the wound is reached, when the suture is passed from below upward through the aponeurosis upon the left side of the wound. The suture is then passed from below upward through the aponeurosis upon the right side of the wound, and an additional suture is taken above this point to fix the suture and take the strain off that part which has brought the muscle in apposition. The aponeurosis is then closed from above downward by catching the aponeurosis from the left side of the wound after the manner of the Lembert intestinal suture, and then passing the needle from below upward through the aponeurosis upon the right side of the wound. When this suture is drawn taut, it slides the aponeurosis of the right side of the wound upon the aponeurosis on the left side of the wound. The process is repeated until the lower angle is reached, when the two ends of the suture are tied. In long wounds two or more mattress sutures are placed to take tension off the lines of continuous suture. The fat is closed with a continuous suture of fine cumol catgut. The skin is closed with fine cumol catgut suture by the intracuticular method. When median wounds are long, extending near or above the umbilicus, care is taken to unite the posterior aponeurotic sheath of the rectus muscle with the peritoneum.⁶

The method was at once used for all wounds of the abdominal wall, including herniotomy wounds, modifying slightly the operation in accordance with the anatomical conditions to be dealt with. In the beginning mattress sutures of silkworm-gut were used to close the aponeurosis. Since introducing the method, I have used it constantly, modifying the details somewhat, but never the principle involved.

In 1898 silkworm-gut mattress sutures were abandoned and a continuous chromicized catgut suture for the rectus muscle and for the aponeuroses was substituted.⁷ With the adoption of catgut it became feasible to make some further

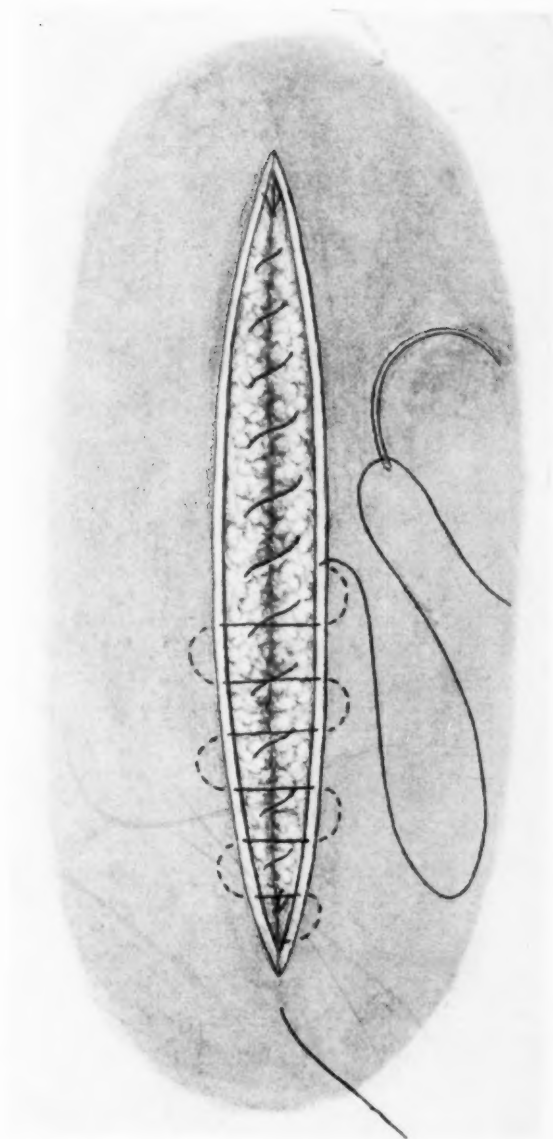


FIG. 5.—The subcuticular suture of the skin.

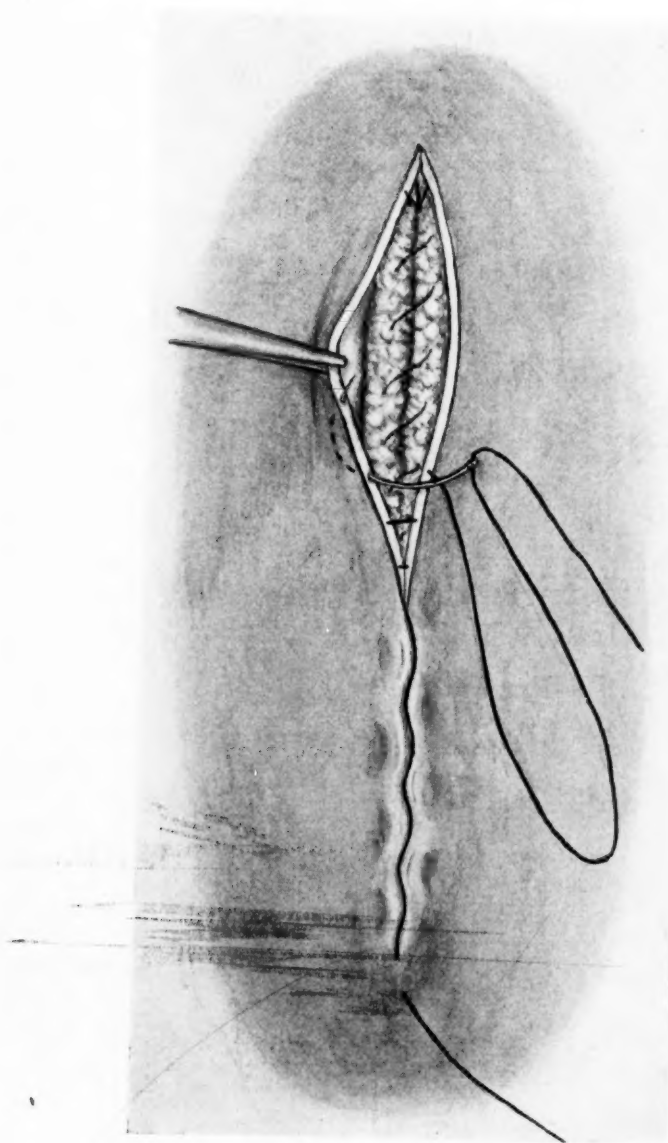


FIG. 6.—Skin wound partly closed by subcuticular suture.

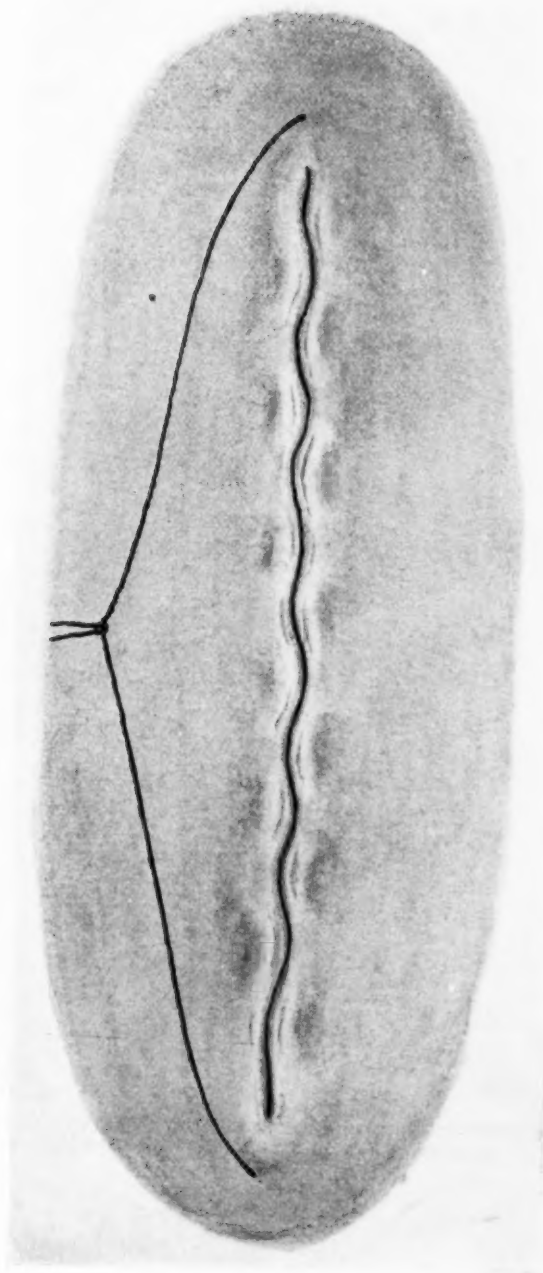


FIG. 7.—Final closure of skin wound.

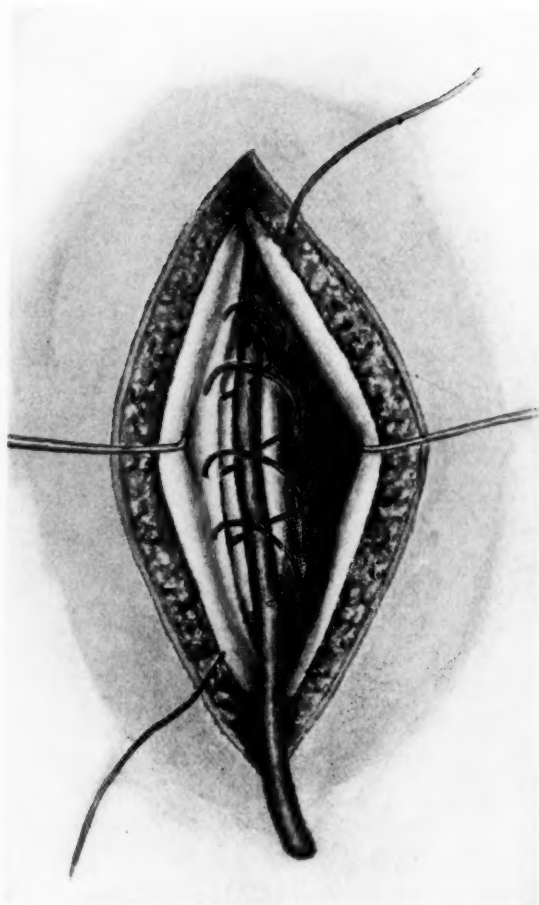


FIG. 8.—Shortening the round ligaments. Suturing the internal oblique round ligament and Poupart's ligament with chromicized catgut, to fasten the ligament and obliterate the canal.

improvements in the method. Care was taken to suture the posterior sheath of the rectus muscle together with the peritoneum when the median incision was high enough to divide that structure. In operating for appendicitis the incision through the outer border of the rectus muscle was adopted, and a fine chromicized catgut suture was employed to close the posterior sheath of the rectus together with the peritoneum. In this way not only the anterior but the posterior aponeuroses were carefully united. The same method of suturing was employed for inguinal hernia and for Alexander operations.^{8, 9}

Having traced the development of the method of overlapping the aponeuroses in its general aspects, a reference to some of its special applications is in order. My original paper, "A New Method of Suturing the Abdominal Wall in Celiotomy" (1897), opens with the following paragraph:

"I desire to report a new method of closing the wound in celiotomy, which I believe will give good results in all cases, and will enable the surgeon to deal successfully with cases of diastasis of the recti muscles, which heretofore have been most difficult to cure."

Since that time the method had been employed repeatedly for the cure of diastasis of the recti, and so far as is known in no case has there been a recurrence or the development of a ventral hernia. I am satisfied that the method by overlapping the aponeuroses will give better results than that proposed by Webster in 1900.¹⁰

In the cure of herniæ the method of overlapping the aponeuroses is especially important and valuable. As already stated, it was first employed by myself in the closure of an umbilical hernia in 1894. Since that time the method has been employed in almost all operations for hernia, whether umbilical, ventral or inguinal. In operations for umbilical hernia at times there is less tension when the aponeurosis is overlapped from above downward instead of from side to side. If good surface-to-surface aponeurotic union can be secured, a permanent cure will be effected even though the recti muscles remain separated. I first made use of the plan of overlapping

the aponeuroses from above downward February 14, 1898. In this case it was impossible to approximate the recti, and as there was far less tension from above downward than laterally the transverse suture was adopted. This method of operating upon umbilical hernia has been largely employed by W. J. Mayo, who first reported upon its use in 1898.¹¹ In this paper, after describing the method of overlapping which he had employed, he states that it was similar to my method of closing celiotomy incisions. Since that time Mayo has made two further reports upon the cure of umbilical hernia by overlapping the fasciæ, and has especially recommended the overlapping from above downward.^{12, 13}

The principle of overlapping the aponeurosis in the cure of inguinal hernia was first applied by Lucas-Championnière in 1892 or earlier.¹⁴ In 1901, in his brochure on the radical cure of inguinal hernia,¹⁵ he reported a series of seven hundred and fifty-nine operations. It is not necessary in this connection to discuss the methods used by Championnière in dealing with the sac and the inguinal canal itself. The question of particular interest is his method of dealing with the aponeurosis. He devised what he calls a U-shaped suture, which is a modified mattress suture, by means of which he overlapped the outer segment of the aponeurosis upon the inner segment, and then by means of interrupted sutures made the approximation neat. I can find no indication that Championnière employed the principle of overlapping the aponeuroses otherwise than in the cure of inguinal hernia, and must therefore conclude that he failed to appreciate its value in the closure of celiotomy wounds in general. The method of suturing which he used accomplishes the overlapping of the aponeurosis very satisfactorily, but it is much more complicated and more tedious in its application than the method which I have devised.

E. Wyllys Andrews was the next surgeon to make use of the principle of overlapping the aponeurosis in the cure of inguinal hernia. He called the method which he devised the "imbrication or lap joint method."¹⁶ He refers to the work of Championnière, which he regards merely as an improvement on the usual method of closing the inguinal canal. His own operation accomplishes two purposes; first, the overlapping

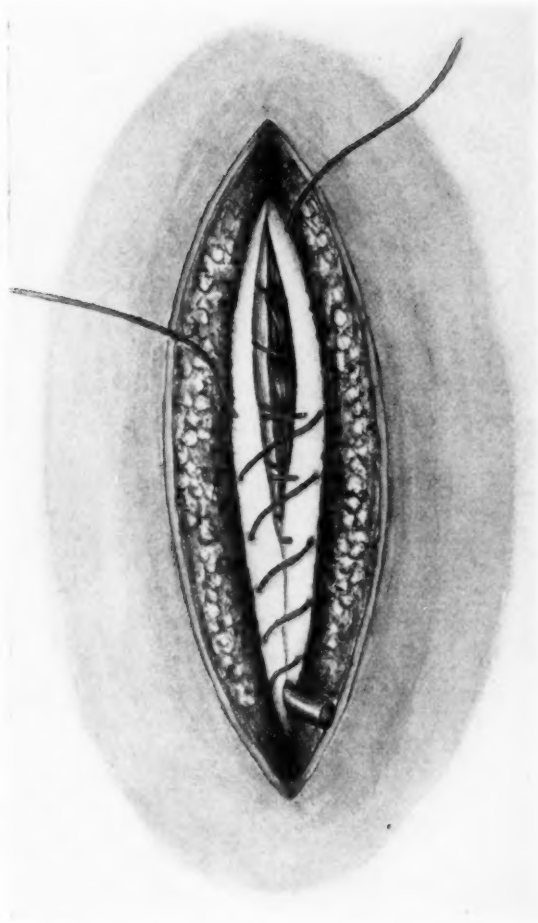


FIG. 9.—Overlapping the aponeurosis of the external oblique in closing the inguinal canal.

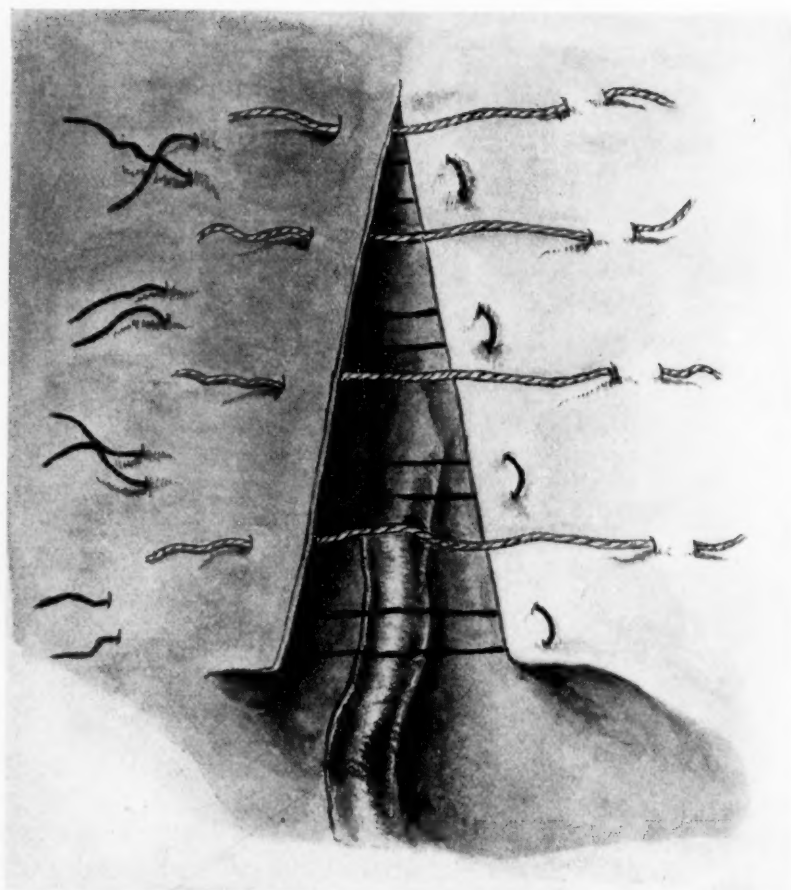


FIG. 10.—Champièrre's method of overlapping the aponeurosis of the external oblique—inguinal hernia. Showing U-sutures, and interrupted sutures in place.

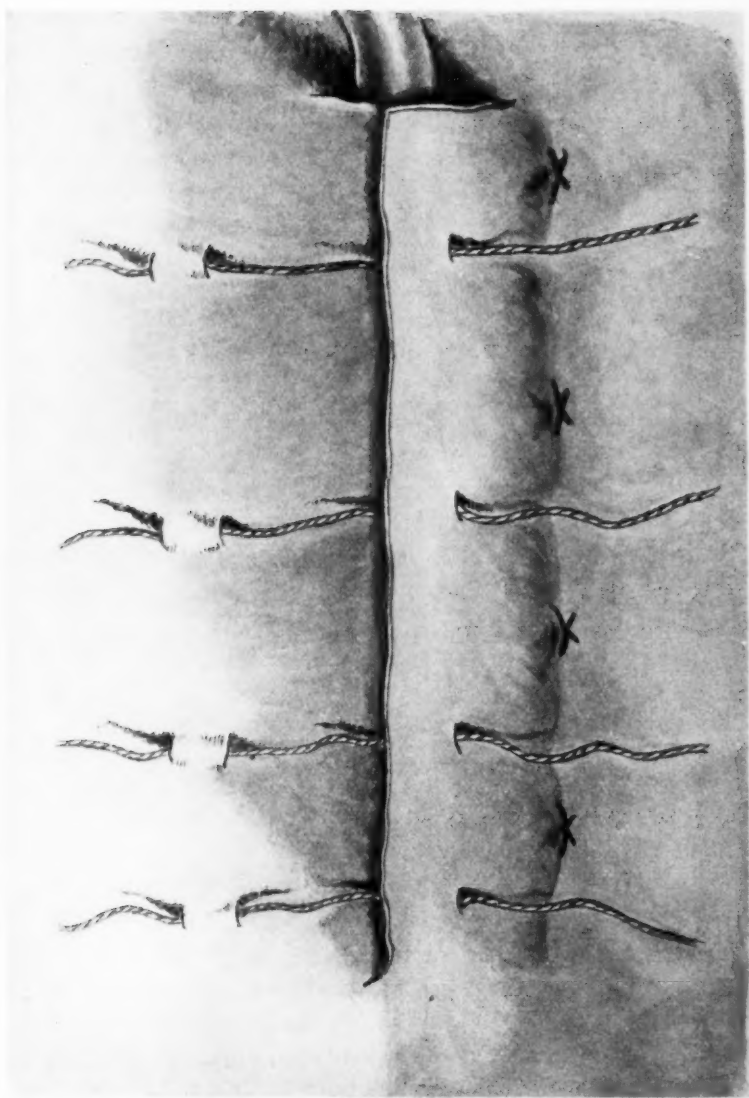


FIG. 11.—Championnière's method—showing the U-sutures tied, and the interrupted sutures in place for tying.

of the aponeurosis; and second, the transplantation of the cord into an artificial canal. He sutures the inner layer of the aponeurosis to Poupart's ligament behind the cord. The outer layer of the aponeurosis is then sutured above the cord to the inner layer. From the standpoint of the more general use of the principle of overlapping the aponeuroses, Andrews' article is of special interest, as he states that "the principle of imbrication or overlapping the several aponeurotic layers of the abdominal wall may enter into other abdominal operations to advantage, as I have repeatedly shown." In a second article on the radical cure of hernia,¹⁷ in 1897, after discussing his own and other methods for the cure of inguinal hernia, he concludes with the following:



FIG. 12.—Andrews' imbrication or lap-joint operation for inguinal hernia.

"I can not refrain from stating that I have found the principle of imbrication applicable to other purposes such as uniting abdominal wounds after ordinary celiotomy near the linea alba and linea semilunaris; but in this part of the subject I cannot hope to interest you at the present time."

It is thus evident that Andrews appreciated the value of the principle in suturing all wounds of the abdominal wall, and therefore it is probable that he made more or less systematic use of it.

If this paper were a study of the development of the radical cure of inguinal hernia, it would be necessary to refer to the operations of Bassini, Halsted and others, but with its actual limitations it is only of interest to point out that in the Johns Hopkins clinic practical experience showed the limitations of the original Halsted operation with the typical mattress suture. Bloodgood tried to meet the necessities of the case in large herniæ by transplantation of the rectus muscle and by use of the sheath of the muscle to take the place of the conjoined tendon.¹⁸ Halsted¹⁹ still later reports that in certain cases he makes a flap from the cremaster muscle, which is sutured to the under side of the internal oblique muscle. The conjoined tendon and the internal oblique are sutured to Poupart's ligament, and then the aponeurosis of the external oblique is overlapped. Halsted states that this is known as the Andrews method, although devised independently by him.

My own work in the cure of inguinal hernia has been incidental to that in abdominal surgery in general and gynecology, and I have never devoted special study to the closure of wounds of the inguinal canal, whether for inguinal hernia or the Alexander operation. In operations for inguinal hernia in women the Bassini operation has been done, with overlapping of the aponeurosis of the external oblique. In the Alexander operation the same technique has been followed, with the exception that the round ligament has been included in the sutures which unite the internal oblique to Poupart's ligament. In addition, I frequently place a mattress suture of silkworm-gut at the internal ring in hernia operations to reinforce this point—the suture entering the external oblique, passing through the internal oblique, through Poupart's ligament, and then back through the internal and external oblique. This suture is tied after the canal is closed in the usual way.

In my own work the development of the principle of overlapping the aponeuroses in the closure of wounds of the abdominal wall grew out of my experience with the other methods of closure previously used, and was the natural consequence of recognizing the shortcomings of these methods. The application of the principle to the cure of inguinal hernia, to the cure of umbilical hernia, and to the cure of diastasis of

the recti muscles, was a natural development from the use of the principle in the usual celiotomy wound, and for operations for appendicitis and for movable kidney. I was not aware of the work of Championnière and Andrews in the cure of hernia, as not being a general surgeon and having no occasion to operate for inguinal hernia in men, I had given no critical study to the special literature concerning inguinal hernia.

It is quite clear that to Championnière is due the credit of having first appreciated the advantages of overlapping the aponeuroses; apparently, however, he did not realize that the principal had any application elsewhere than in the inguinal canal. With Championnière's work as a basis, Andrews developed a special technique for the cure of inguinal hernia, and also more fully appreciated the importance of the principle, as shown by the references already given to his articles, in which he claims that the method can be applied with advantage to the usual celiotomy wounds. It is evident that the process by which Andrews arrived at this opinion was exactly the reverse of my own experience. A realization of the advantages of the method in the special operation for the cure of inguinal hernia suggested its employment in all other abdominal wounds; whereas, in my own work the appreciation of the advantages of the method in the closure of abdominal wounds in general led to its employment in the special operations on the inguinal canal.

The best evidence which I can give as to the practical merit of the method in the prevention of post-operative hernia is the fact that during the nine years in which the method has been in use, but a single patient has presented herself with post-operative hernia. Others may have occurred of which I have no knowledge, but it is quite clear that post-operative hernia plays an unimportant rôle when the aponeuroses are overlapped in the closure of celiotomy wounds.

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FOREIGN-BODY PSEUDO-TUBERCULOSIS OF THE PERITONEUM.

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PSEUDO-TUBERCULOSIS, a term coined by Eberth in 1885, has widened in its application so as to include under its designation all conditions which anatomically resemble genuine tuberculosis, whatever their etiology.

Ophüls, in a valuable survey of this subject in the Reference Handbook of Medical Sciences, Vol. VI, page 778, adopts the following etiological classification:

1. Pseudo-tuberculosis caused by the bacillus Pseudo-tuberculosis Rodentium. Two not altogether convincing instances of human infection are reported in this connection.
2. Pseudo-tuberculosis caused by a bacillus resembling the bacillus of Pseudo-tuberculosis Rodentium. Du Cazal reports two such cases, in one of which nodules the size of a hazelnut were found on the surface of the peritoneum, in the pancreas and liver. Wrede records another instance of such infection in which miliary nodules were found on the peritoneum, as well as in other localities. The causal bacillus possessed acid fast staining properties.
3. Pseudo-tuberculosis caused by other bacilli, as, *e.g.*, bacilli resembling the Diphtheria bacillus.
4. Pseudo-tuberculosis caused by filamentous bacteria. Eppinger records a case of brain abscess. Flexner, under the designation of Pseudo-tuberculosis Hominis, reports an instance in which tubercular-looking lesions were found in the lungs and tubercle-like nodules in the peritoneum. A streptothrix was apparently the pathogenic germ.
5. Pseudo-tuberculosis caused by mould fungi, *e.g.*, pigeons' pseudo-tuberculosis due to the aspergillus mould. Several instances of human mould infection are on record.

6. Pseudo-tuberculosis produced by the organism of *Blastomycetes Dermatitidis*.

7. Pseudo-tuberculosis produced by the fungus *coccidiodes*. Here the combination of the miliary abscess and miliary tubercles may be very bewildering, as Ophüls has pointed out.

8. Pseudo-tuberculosis caused by animal parasites and their eggs.

9. Pseudo-tuberculosis produced by dead foreign bodies.

The first seven varieties are mainly of interest to the physician, and are becoming clinically more important, since the list of reported cases of lung disease is constantly lengthening, in which symptoms and physical signs suggestive of tuberculosis may occur, together with acid fast bacilli in the sputum, and yet the ailment be non-tubercular in origin. Some of these cases, however, are only clinically pseudo-tubercular, the underlying pathologic lesion not resembling genuine tuberculosis. From what has been said, it will be seen that if the peritoneum be involved in these varieties, it occurs in association with similar lesions elsewhere, and serious errors in intra-abdominal operative work are not apt to occur. The last two varieties, however, possess a special significance for the surgeon, as the following cases will show:

Helbing, in the *Berl. klin. Wochenschr.* 1899, page 714, records as follows: A laparotomy was performed for perityphlitis. Tubercles were seen on the omentum and cæcum. A piece of omentum was removed. With the endeavor to demonstrate the tubercle bacillus, sections were made and suitably stained. In place of the bacillus, the eggs of the tænia worm were found occupying the center of the nodules lying among the giant cells. Helbing ascribes the lesions to the escape of these eggs from a perforated appendix, they acting as chronic localized peritoneal irritants. He credits Miura, of Tokio, with a similar observation, but omits the reference.

Carl Meyer, in the *Beitr. z. Pathol. Anat. u. Allegem. Pathol.* xiii, 1, 1903, reports a case of a woman who had had an abdominal tumor for some years. A few weeks previous to her entrance to the hospital it had evidently ruptured. There was now free fluid in the peritoneal sac. Examination of the aspirated fluid showed cholesterin crystals and red blood cells. Laparotomy demonstrated an ovarian cyst, many peritoneal miliary tubercles, and in their neighborhood fibrinous masses. Macroscopic examination of tissue removed resulted in the diagnosis of a

dermoid ovarian cyst and tubercular peritonitis. Microscopic investigation, however, revealed the true nature of these little bodies; they were pseudo-tubercles. In their center were giant cells, and amongst the giant cells, and in some instances enclosed in these cells, were cholesterol crystals. The diagnosis was then changed and naturally—an all important point for the patient—the prognosis. Meyer then refers to several instances of pseudo-tuberculosis of the conjunctiva and iris due to the irritation and enclosure of little hairs, and to experiments showing the formation of giant cells around wound ligatures. He records two other extremely interesting cases.

The first (Von Recklinghausen) concerns a woman who died from pneumonia several months after being laparotomized. A disseminated tuberculosis of the abdomen was found. Microscopic examination of the tubercles, however, showed that it was another instance of foreign-body pseudo-tuberculosis, little pieces of sponge left behind in the abdomen at the time of the operation being found within the nodules.

In the second case, first reported by Hanau in the *Correspondenzblatt für Schweizer Aerzte Jahrbuch*, xxi, a man who had had typical symptoms suggestive of gastric ulceration for upwards of five years, was seized twelve days previous to his death with epigastric pain, accompanied by fever. Postmortem revealed a large ulcer saddling the lesser curvature and this had perforated; in the adhesions round about and in the neighboring peritoneum were numerous miliary tubercles. Though the ulcer looked to be of a simple nature, it was suspected to be carcinomatous, these little nodules being regarded as possibly metastatic, more particularly as there was no possible primary tubercular focus except a partially calcified bronchial gland. Microscopic examination demonstrated that the little bodies were pseudo-tubercles and that amongst the giant cells were enclosed little remnants of vegetable food. The ulcer was non-malignant in character.

Dévé (*Revue de Chirurgie*, July, 1902, page 67), in an article entitled "Des Cholérægies Internes," collates thirteen instances of "Cholépéritone Hydatique." Amongst these thirteen are four in which pseudo-tuberculosis of the peritoneum had occurred. The causal irritants were the hydatid hooklets or small pieces of hydatid membrane. In one case (De Quervains, reported in the *Centrabl. f. Chir.* 1897, No. 1), much difficulty in diagnosis resulted, even though the ascitic fluid was bile-stained. In another case (Debove and Soupault, *Soc. méd. des. hôp.*, 9th Dec., 1902, et 19th October, 1894), an actual error was made and the abdomen closed in consequence. Dévé's description of these tubercles is so clear that I quote him in full. He says:

These pseudo-tubercles are commonly of the size of a pin-head or millet-seed; they are whitish or translucent. Macroscopically they are often indistinguishable from genuine miliary tubercles, and appear as though modelled after these lesions. They may occur over the parietal or visceral peritoneum or in the omenta. They are covered by the peritoneal endothelium and appear as though embedded in the subendothelial peritoneal cellular tissue. By introducing under them the taut finger they are rendered more salient. Microscopically, they may resemble miliary tubercles even down to the finest histological detail. Many multinucleated giant cells are present in the centre of these newly-formed little nodules. The giant cells are surrounded in their turn by a mixed layer of epithelioid and round cells. But characteristic or pathognomonic of these pseudo-tubercles are the causal irritants which are found lying amongst the giant cells. In the cases collated by D  v   pieces of laminated hydatid cyst membrane, or the characteristic hooklets, were thus included. Calcification even may take place in some of the nodules. He draws particular attention to these bodies and notes the absence of all allusion to them in French books, and the liability of the surgeon to diagnostic error. He believes their formation to be a protective process and remarks that they may occur on other serous membranes than the peritoneum. Thus he quotes Lehne who recorded a similar pseudo-tuberculosis of the medullary meninges occasioned by the rupture of an hydatid cyst of the spinal column. He further adds that not all the little bodies found in the cases he records were of the nature described above, some being the early stage of secondary hydatid cyst development.

The non-tubercular origin of these little structures is convincingly established, for tubercle bacilli can neither be demonstrated in section, by culture, or by guinea-pig inoculation; and, moreover, the characteristic lesions can be, and frequently have been, produced experimentally by the injection of tubercle free foreign bodies. Thus, Wallenburg produced such lung pseudo-tubercles by intra-tracheal injection of droplets of metallic mercury. D  v   produced them in rabbits by the injection of hydatid scolices, etc.

I have not been able to find any record of similar cases in English or American literature, but in Rolleston's "Diseases of the Liver, Etc.," in the discussion of the results of intra-peritoneal rupture of liver hydatid cysts, brief mention is made of these pseudo-tubercles, and D  v  's article referred to, whilst in Herman's "Diseases of Women," page 776, the following pregnant paragraph is to be found: "The question has been raised but never settled, as to those cases in which the

peritoneum is studded with little bodies looking and feeling like miliary tubercles,—whether these bodies are really the product of the tubercle bacillus? In the cases that recovered there is no evidence for or against.”

The following history is of interest:

A. B., a middle-aged plump woman was admitted into the German Hospital under the care of Dr. Jellinek, to whom I owe the privilege of seeing the patient and reporting the case. She was a feckless individual and gave a very unsatisfactory history. We eventually learned that she had been seriously ill for six weeks, and that her illness had begun acutely with pain in the lower abdomen, which she insisted upon ascribing to coition vaginal injury. There was no temperature; the face was pale; the pulse quick and feeble; there was marked aversion to food, but no vomiting, and no obstruction symptoms. Her bowels were reported to have moved the day previous. The lungs were normal. The heart sounds were feeble, but no murmur was audible. Examination of the nervous system was negative. The abdomen was well clothed with fat, was somewhat distended, and over the right ovarian region a linear scar was present. There was no rigidity of the abdominal wall, but some tenderness was evident on slight pressure over the bladder region. The liver and spleen were not palpable. The percussion note was dull, and free fluid was present in the peritoneal cavity. Posteriorly, there was dullness to percussion up along the ascending colon, and a slight filling out of this area when compared with the corresponding region of the opposite side. Vaginal examination revealed some thickening of the left tubo-ovarian structures. Rectal examination was negative. The urine, small in amount, gave a Diazo reaction, but was otherwise normal. The leucocytes numbered 12,000 per c.m., 70 per cent. being of the polynuclear variety.

In view of the acute onset, her clinical aspect, the leucocytosis, and the post colonic dullness, I believed her to be suffering from a sub-acute infective peritonitis with a localized post-colonic collection of pus, due to a diseased tube or appendix, rather than from a tubercular peritonitis, which appealed to us as the most likely alternative diagnosis. She was referred to the

surgical side and her abdomen opened. A large quantity of brownish serous fluid was evacuated. The intestines and peritoneum that presented were seen to be covered with innumerable miliary tubercles, though (and we would emphasize the point) no matted fibrous bands or enlarged glands were evident. A diagnosis of tubercular peritonitis was made, the abdomen emptied of fluid as far as possible and then closed. The patient continued to weaken and shortly died. Even after the operation I could not correlate her appearance and the clinical findings with an uncomplicated tubercular peritonitis, and so sent her to the postmortem room with a diagnosis of tubercular peritonitis as discovered at operation, plus a peritoneal infection. At the autopsy, made by Dr. Ophüls, the small miliary tubercles were much in evidence, being present over the general peritoneum. The intestines were somewhat matted together by recent fibrinous adhesions. There were no old fibrous bands and no abdominal glandular enlargement. The appendix was normal and there was no pelvic infection. The post colonic dullness was due to a localized collection of pus. Examination of the stomach showed a large perforated gastric ulcer saddling the lesser curvature and small carcinomatous nodules were present in the liver, which, however, was not enlarged and was well up under the rib margin.

The macroscopic examination thus revealed:

1. Subacute septic peritonitis secondary to a perforation of a gastric ulcer as the immediate cause of death.
2. Small carcinomatous nodules in the liver.
3. Small miliary tubercles in the peritoneum which, from their naked-eye appearance, might be: (1) Miliary tubercles; (2) miliary carcinomata; (3) pseudo-tubercles. No primary tubercular focus was present. They were thus probably either carcinomatous or pseudo-tubercular.

Microscopic examination by Dr. Ophüls, to whom I am much indebted for the report, demonstrated that the gastric ulcer was carcinomatous in nature and that the peritoneal nodules were pseudo-tubercles containing no bacilli, but showing in their interior little food particles, which were surrounded by giant cells, they thus corresponding to the pseudo-tubercles found in Hanau's patient.

The record of this patient is extremely instructive, inasmuch as the history (true an imperfect one) did not suggest any ailment of the stomach. Moreover, all symptoms were referred to the lower abdomen, and the few clinical signs present pointed to a lesion in that vicinity. Looking back, I believe that in the absence of a reliable history my original diagnosis should have read, "Sub-acute septic peritonitis plus a retro-colonic abscess—origin uncertain," thus leaving the further elucidation to the operating surgeon. I had seen, some years previously, a patient in whom a tentative diagnosis of tubercular peritonitis had been made. Sudden collapse took place and death ensued. The autopsy showed a gastric ulcer which had evidently perforated, had been occluded by the omentum and then re-perforated, causing the fatal collapse. In that patient there were, similarly, no symptoms or signs referable to the stomach, but then the ulcer was occluded till just a few hours previous to death. In this case, however, the perforation was a large one and there was no indication of any such occlusion.

From this case history and the history of the collated instances of pseudo-tuberculosis, we learn that exploration of the abdomen should be thorough, and that a too hasty operative diagnosis of tubercular peritonitis is to be avoided, more particularly if old fibrous bands or enlarged intra-abdominal glands be absent, otherwise avoidable fatalities may result. If the ascitic fluid be bile-stained, echinococcic pseudo-tuberculosis will be thought of; on the other hand, if fibrinous or pseudo-myxomatous masses are found in the abdominal cavity a ruptured ovarian cyst will be looked for, but though no free-food particles be recognizable as in the reported case, gastric perforation of some little standing cannot be definitely ruled out without an exploration of the upper abdomen. They further serve to once again draw our attention to a fact long recognized by pathologists, viz., that the demonstration of the tubercle bacillus by staining, culture or inoculation, is the only sure proof of its being a causal agent in the production of any lesion, however much that lesion may anatomically resemble genuine tuberculosis.

SOLID TUMORS OF THE MESENTERY WITH REPORT OF A CASE AND A REVIEW OF THE LITERATURE.

BY JAMES VANCE, M.D.,

OF EL PASO, TEXAS,

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ALTHOUGH within recent years a good many cases of solid tumors of the mesentery have been reported the condition is still sufficiently rare to attract the attention of medical men.

Mesenteric tumors were described as early as 1803 by Portal, and classified by him as scirrhus, steatomatous, stony, cancerous and hydatid. He describes the diagnostic features clinically and points out the difficulty of differentiating between mesenteric and omental tumors. His work attracted very little attention, most probably because it was post-mortem. We hear nothing more of mesenteric tumors till 1880, when Tillaux reported a case of *cyst* of the mesentery successfully removed. In the same year Péan reported three such cases operated on by him, giving the diagnosis and treatment. In the next few years numerous cases of cysts were reported, but reports of solid tumors were exceedingly rare. So rare was this condition of solid tumors of the mesentery that Mr. Lockwood states that no such tumor had been exhibited to either the London Pathological or Medical Society prior to 1895. In 1897 Mr. Shield reported a case to the Medical and Chirurgical Society of London, at which time the subject was quite unfamiliar to that society. Douglas read a paper on this subject before the Southern Surgical and Gynecological Society in 1898, and no surgeon present had had any operative experience with these tumors.

Lipomata are said to be the most frequently found solid tumors, and these sometimes attain enormous size. Von Bergmann reports that Terillon removed one weighing 29 kg.



FIG. 1.—Gross appearance of tumor of mesentery.

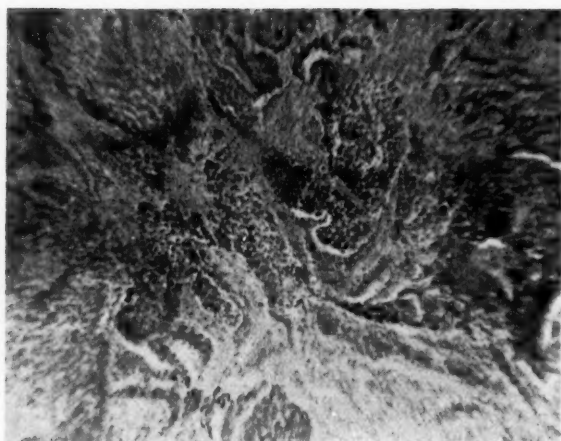


FIG. 2.—Sarcoma of mesentery. Photo-micrograph, magnified 50 diameters.

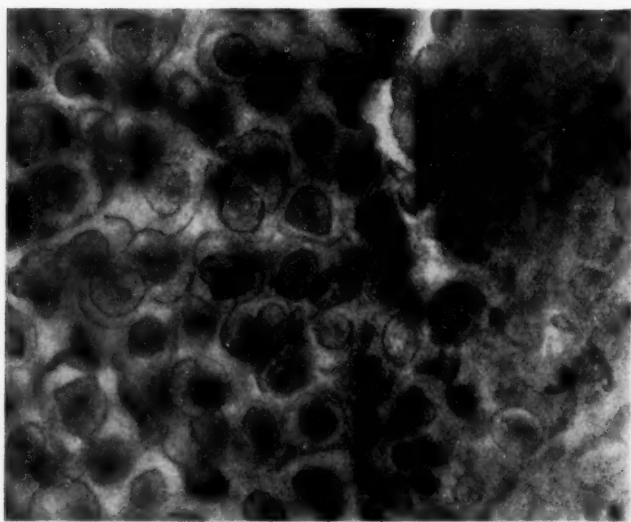


FIG. 3.—Sarcoma of mesentery. Photo-micrograph, magnified 425 diameters.

(64 lbs.). Van der Veer had one of 28 kg. and Péan another of 28 kg. Waldeyer describes a lipomatous myxoma with metastases in the lungs and other organs, weighing 61 lbs. Other primary tumors of the mesentery are fibroma, myxoma, enchondroma, teratoma, sarcoma, and adenoma; also mixed growths as fibro-lipoma, fibro-myxoma, fibro-myo-sarcoma, and lymphadenomata. Carcinoma is said never to be primary but always secondary, as a metastasis to a primary lesion elsewhere. This seems disproved by the case of primary carcinoma of the mesentery reported by Wanless in 1903 (see Case 22 of Table I).

The seat of these tumors is usually in the mesentery of the small intestine, but there are now several cases reported as seated in the mesocolon and sigmoid flexure. As new cases are reported the formerly restricted lines of origin and kinds of growth are widened till it now bids fair to include all mesentery as field of origin and nearly all kinds of tumors as the bounds of the new growths. The embryologic development of the mesentery makes this prediction likely if the embryonal theory of the origin of tumors amounts to anything.

TABLE I.—SOLID TUMORS OF THE MESENTERY.

Case.	Reporter.	Sex.	Age.	Growth.	Previous History.	Operation.	Attachment.	Resection.	Post-Operative History.
1	Dallmann. Inaug. Dissert. Halle, 1903.	M.	40	Numerous nodular fibroid masses.	Constipation, bowels moving only by enemata. Headache and intestinal indigestion. Symptoms for 5 months.	Incision from xiphoid to symphysis. Large tumor removed with difficulty from mesentery alongside of vertebral column. Drain and tamponade.	Mesocolon and mesentery.	None.	Dismissed from hospital as cured on 26th day.
2	Gildermeister. Inaug. Dissert. Breslau, 1902.	F.	22	Fibroma with points of calcareous degeneration.	Obstipation, with vomiting, which became fecal three days prior to operation.	Median incision and small tumor removed from front of vertebral column between folds of mesentery.	By pedicle to mesentery.	None.	Recovery in 20 days.
3	"	F.	30	Spindle-celled sarcoma.	Pain and swelling in right side of abdomen. Other symptoms negative.	First Operation—Omentum adherent to tumor, which on separation opened an abscess from behind tumor. Drainage. Second Operation—Removal of entire growth.	To mesentery with many adhesions.	None.	First Operation—Pus drained for several days. Second Operation—Followed by complete recovery. Some months between the operations.
4	"	F.	8	Angio-sarcoma morphology of numerous semicircular dark red nodular masses.	Taken suddenly ill 8 days previous to operation with pain in abdomen. No vomiting or constipation.	Tumor removed with adherent bowel. No connection to reproductive organs.	Connected with mesentery where adherent except to bowel.	9 cm. of healthy bowel.	Death on 9th day from exhaustion.
5	"	F.	38	Fibroma.	Premature birth one year ago, since which she noticed a movable tumor in the abdomen. Pain, constipation and dyspnea; 3 months pregnant at time of operation.	Tumor removed with adherent intestine. Anastomosis with Murphy button.	Mesentery and small intestine.	35 cm. of small intestine.	Recovery.
6	"	F.	33	Fibroma.	Swelling in abdomen noticed for 4 years. Severe pain and diarrhoea during last 3 mos.	Tumor very adherent, removed along with adherent intestine.	Between folds of mesentery.	23 cm. of gut.	Recovery.

7	Gil dermeiter. Inaug. Dis- sert. Breslau, 1902.	M.	41	Pure fibroma weigh- ing 2½ kg.	Since 6 months has noticed hard mass size of child's head in abdomen. Freely movable.	Tumor removed from be- tween folds of mesentery.	2 cm.	Recovery.
8	"	F.	42	Myxofibroma, weigh- ing 20 kg.	Large growth in abdomen, giving a circumference meas- ure of 2 meters at umbilicus.	Tumor easily removed.	None.	Recovery.
9	"	F.	32	Lipoma, weight 17½ kg.	Continuous abdominal pain for 2½ years. Frequent vomiting and obstipation. Large nodular mass in ab- domen.	Whole abdomen filled with growth distinctly fluctuat- ing in two places. Whole growth removed.	8 cm.	Recovery.
10	"	M.	41	Sarcoma with nu- merous spaces of fatty degeneration. Weight 12½ kg.	Tumor in abdomen which in 5 months developed great size. Tumor filled whole ab- dominal cavity. Was hard, nodular and <i>painless</i> .	Removal of tumor.	1.27 meters.	Death on 2d day from indefinite causes.
11	"	M.	....	Myxoma with metas- tases in sigmoid flex. and liver.	Was twice operated on in 3 years for mesenteric tumor. First operation removed a growth size of a man's head with resection of 48 cm. of gut. Was then well for 2 years. Had a recurrence, and a smaller tumor with the same amount of gut were again removed. Third recur- rence at end of 9 months. Tumor with ascites.	Third Operation—Tumor about the size of an apple was removed. Numerous adhesions to intestines.	48 cm. re- moved at 1st and 2d opera- tion each.	Death shortly after third operation.
12	"	F.	....	Lymphangioma.	Tumor with ascites.	Removal of tumor and ad- herent intestine.	50 cm.	Recovery.
13	Hermes. Deutsch. Mod. Woch- enschr., 1901. XXVII, 245.	F.	....	Large spindle-celled tumor, exact nature not stated.	Sick for 2 years with movable tumor in abdomen, beneath umbilicus. Nodular and solid.	Attached omentum in being detached opened pus cavity. Tumor was re- moved with attached mes- entery and bowel. Gut united by Murphy's button.	Amount of gut not stated.	Recovery with no history of recur- rence.
14	Lexer, E. Ber- lin. Klin. Wochenschr. 1900. XXXVII, 4.	M.	41	Fibroma.	Was well previous to April, 1899, when he was seized with colicky pains, increas- ing in severity. Tumor pal- pated, freely movable.	Tumor and involved bowel removed.	"Exten- sive."	Recovery in 20 days.

TABLE I.—SOLID TUMORS OF THE MESENTERY—Continued.

Case.	Reporter.	Sex.	Age.	Growth.	Previous History.	Operation.	Attachment.	Resection.	Post-Operative History.
15	From Jahresb. u. d. chir. Abt. d. Spital in Basel. 1901, 61.	F.	40	Sarcoma.	Complained for 4 months of pain in left hypochondrium, radiating from the navel; with gradual development of tumor in middle of abdomen.	"Exploratory." Tumor covered by mesentery with great masses of congested blood vessels. Small intestines pushed to right and colon passing over growth. In pelvis was a large quantity of liquid blood and coagula and fibrin. Operation could not be completed.	Mesentery with no connection with uterus.	None.	Death, with post-mortem diagnosis of "Sarcoma of mesentery with intra-abdominal hemorrhage."
16	Kownatzki Deutsch Militair. Zeitschrift. 1904, XXXIII, 254.	M.	24	Tubercular tumor the size of a child's head.	Pain in abdomen since April, 1903. Pain (May 5th, 1904) localized to left of navel. No bowel trouble. Fever continued from 13th to 15th, and remitted till 29th. Spleen not enlarged; leucocytes 6000. Anemia. Hard, painful, slightly movable tumor to left of navel.	Abdomen opened over tumor, but nothing more done. Three days later wound was reopened and on account of malignant appearance of growth and metastases in lungs wound was again closed.	Within the mesentery.	None.	Death 2 days after operation. Autopsy: Tuberculosis with metastasis in liver, spleen and lungs.
17	"	M.	21	Lympho-sarcoma. Tumor size of child's head.	Injured by falling from horse. Severe pain in pelvis when admitted to hospital. Next few days had temp. 38.6 C., fainting spells, nose bleed, meteorism, vomiting, severe abdominal pains, diarrhoea and distended abdomen. Later constipation.	Abdominal section for relief of severe symptoms. Tumor not removed. Adherent to intestines and second lumbar vertebra.	Mesentery with extensive intestinal attachments.	None.	Death soon after operation. Necropsy showed stomach and ileum adherent to "brain-like" growth surrounding pelvis of left kidney and ureters.
18	Latouche. Bull. et Min. Soc. de Chir. de Paris. 1900, XXVI, 889.	F.	53	Lipoma.	Woman of large physique and well nourished, presented all the symptoms of an ovarian tumor. Tumor nodular; no ascites.	Removal of tumor.	Between folds of mesentery.	None.	Recovery in 19 days.

TABLE I.—SOLID TUMORS OF THE MESENTERY—Continued.

Case.	Reporter.	Sex.	Age.	Growth.	Previous History.	Operation.	Attachment.	Resection.	Post-Operative History.
15	From Jahresb. u. d. cliv. Abt. d. Spital in Basel. 1901, 61.	F.	40	Sarcoma.	Complained for 4 months of pain in left hypochondrium, radiating from the navel; with gradual development of tumor in middle of abdomen.	"Exploratory." Tumor covered by mesentery with great masses of congested blood vessels. Small intestines pushed to right and colon passing over growth. In pelvis was a large quantity of liquid blood and coagula and fibrin. Operation could not be completed.	Mesentery with no connection with uterus.	None.	Death, with post-mortem diagnosis of "Sarcoma of mesentery with intra-abdominal hemorrhage."
16	Kownatzki Deutsch Militair. Zeitschrift. 1904, XXXIII, 254.	M.	24	Tubercular tumor the size of a child's head.	Pain in abdomen since April, 1903. Pain (May 5th, 1904) localized to left of navel. No bowel trouble. Fever continued from 13th to 15th, and remitted till 29th. Spleen not enlarged; leucocytes 6000. Anemia. Hard, painful, slightly movable tumor to left of navel.	Abdomen opened over tumor, but nothing more done. Three days later wound was reopened and on account of malignant appearance of growth and metastases in lungs wound was again closed.	Within the mesentery.	None.	Death 2 days after operation. Autopsy: Tuberculosis with metastasis in liver, spleen and lungs.
17	"	M.	21	Lympho - sarcoma. Tumor size of child's head.	Injured by falling from horse. Severe pain in pelvis when admitted to hospital. Next few days had temp. 38.6 C., fainting spells, nose bleed, meteorism, vomiting, severe abdominal pains, diarrhoea and distended abdomen. Later constipation.	Abdominal section for relief of severe symptoms. Tumor not removed. Adherent to intestines and second lumbar vertebra.	Mesentery with extensive intestinal attachments.	None.	Death soon after operation. Necropsy showed stomach and ileum adherent to "brain-like" growth surrounding pelvis of left kidney and ureters.
18	Latouche. Bull. et Min. Soc. de Chir. de Paris. 1900, XXVI, 889.	F.	53	Lipoma.	Woman of large physique and well nourished, presented all the symptoms of an ovarian tumor. Tumor nodular; no ascites.	Removal of tumor.	Between folds of mesentery.	None.	Recovery in 10 days.

	F.	42	Lobulated fibroma.	Began with abdominal pain 3 years ago, with enlargement. Menstruation regular. Abdomen measures 85 cm. in circumference.	Tumor removed. Adhesions to intestines and epiploon.	Mesoileum.	Of bowel involved.	Recovery.
19	Duranon (L.) Revista d. la Soc. Med. Buenos Ayres, 1901, IX, 499.	M.	26	Lymphosarcoma.	Of no interest.	.....	None.	Death following operation.
20	Canalis, G. Anal. di Med. Naval Roma, 1904, X, 303.	F.	34	Fibroma, weight 30 lbs., undergoing myxomatous degeneration.	Tumor simulated cyst of ovary. Pelvic organs and kidney healthy.	Removal of tumor through abdominal cavity.	None.	Recovery.
21	Doran Brit. Med. J. 1904, II, 1075.	M.	14	Colloid carcinoma. The wall of tumor was very thin and friable, discharging large quantities of amber colored gelatinous fluid.	Swelling in abdomen first appeared 6 months ago size of a child's fist and rapidly increasing in size.	Removed tumor of doughy feel extending in direction of stomach beneath the liver and transverse colon.	None.	Death on 3d day.
22	Wanless, W. J. The Indian M. Gaz. 1903, XXXV III, 377.	F.	60	Hæmatoma very vascular with fibroid capsule. Mass of tumor is composed of network of fibrin in different stages of organization.	Several weeks of increasing pain and discomfort in abdomen; about a month before operation felt a "lump" in abdomen. Pain became very severe, with vomiting and great depression. Tumor size of man's head and movable.	On opening peritoneum sero-sanguineous fluid escaped. A dense, hard, slightly nodular tumor was found which had twisted the gut to right angles with its long axis $1\frac{1}{2}$ turns, forming a volvulus with tightly twisted pedicle.	73 inches of small intestine.	Death on 4th day from bronchitis.
23	Moyrnan, Med. Chronicle, Manchester, 1902, III, 367.	F.	26	Fibroma.	Symptoms of ovarian tumor.	Tumor removed with its adherent gut.	24 in.	Recovery.
24	Murphy, J. B. Clinic Review, 1904, XIV, 193.	M.	40	Sarcoma.	Tumor in central portion of abdomen recognized about a months ago by patient. Indigestion prior to that time. Tumor movable but sensitive to touch.	Tumor lay in pelvis from which it was easily brought out, but a portion of small intestine to which it was attached broke and "leaked" into the abdomen, but was promptly controlled. Tumor was removed with a large amount of small intestine.	8 ft. 2 in. of small intestine.	Death in 36 hours from peritonitis.

TABLE I.—SOLID TUMORS OF THE MESENTERY—Continued.

Case.	Reporter.	Sex.	Age.	Growth.	Previous History.	Operation.	Attachment.	Resection.	Post-Operative History.
26	Grandin, E. H. Am. J. Obst., 1902, XLVI, 225.	F.	....	"Hen's-egg" shaped tumor, friable and contents of which somewhat resembled the decomposed yolk of an egg." Dermoid cyst (?) possibly a Colesteoma.	Patient was referred by family physician for removal of abdominal tumor.	Tumor was not readily found but was finally located in mesentery of jejunum, and removed.	Mesentery of jejunum.	None.	Nothing given.
27	Kengla, Louis A. Occidental Med. Times, 1902, XVI, 140.	M.	70	Pure fibroma, weighing 4½ lbs.	Enlargement of abdomen first noticed 3 years previously. No pain or discomfort, but obstipation, which led him to consult his physician.	Tumor and involved bowel removed and anastomosis by Murphy's button. Bowel was peculiarly wrapped around tumor.	Mesentery.	Involved intestine 87 inches.	Died on 3d day.

In reviewing the literature of the past five years there are found twenty-eight cases of solid tumor of the mesentery. (See Table I.) Twenty-seven of these cases I have tabulated for reference. The twenty-eighth case, that of Doleris' (*Gynecologic, Paris*, 1904, Vol. iv, 108) could not be obtained and consequently I am not sure it belongs to this group, so have been obliged to pass it by in the following analysis. An analysis of these cases shows the following:

TABLE II.—SOLID TUMORS OF THE MESENTERY.

Kinds of Tumor	No. of Cases	Recoveries	Deaths	Mortality (percentage)
Fibromata	9	8	1	11.1
Sarcomata	7	1	6	85.7
Lipomata	2	2	0	0.0
Myxofibromata	2	2	0	0.0
Carcinoma	1	0	1	100.0
Lymphangioma	1	1	0	0.0
Tubercular	1	0	1	100.0
Colesteoma (?)	1	1	0	0.0
Hæmatoma	1	0	1	100.0
Myxoma	1	0	1	100.0
Large Spindle-celled Tumor	1	1	0	0.0
Totals	27	16	11	40.7

A further analysis of these cases shows that out of the twenty-seven operations there were 13 resections of gut, varying in length from 4/5 in. in the shortest to 8 ft. 2 in. in the longest. Of these 13 resections, six died and seven lived, or a mortality of 46.15%. Three of these resections were for sarcoma, all of which died. Five were for fibromata and one only died, which gives a mortality of 20%. The number of males affected is 11, ranging in age from 14 to 70 years, against 16 females ranging in age from 8 to 60 years.

In this series of cases the fibromata are most numerous, with the sarcomata a close second. When we consider that Case 11 of series was most probably a sarcoma (since it formed metastases in liver and sigmoid flexure) we have 8 sarcomata against 9 fibromata. With the carcinoma case we have 9 malignant cases out of 27, or 33 1/3% of series.

As to etiology we know nothing, our ignorance being quite as profound as about tumors springing from other sources. Trauma is said to be a cause and we all know how unreliable a history of trauma is, especially when leading questions are asked; still in Case 17 of series the sarcoma was either caused by, or more probably hastened in its course by the patient's falling from his horse and hurting himself badly. Cases are not uncommon in children. Arnstein reported a case at the age of 4 years, and collected nine others in children. The present series shows two in children of 8 and 14 years, while my own case could not have occurred later than 12 years when the patient noticed the growth herself. Most of the cases occurred between the ages of 30 and 45, with the extremes of age from our present knowledge between 4 and 70 years.

All of these tumors seem to have a special tendency to become malignant, sooner or later, even though they may remain benign for years. Most of them become rapidly malignant. This seems especially to be the case in very young patients if growth is rapid. The origin is generally between the folds of the mesentery, or else retroperitoneal; the growth pushing its way between the folds of the mesentery as it enlarges, and at the same time growing backward and becoming attached to the vertebral column. In my own case the origin was probably intermesenteric, with early pedunculation, for the tumor was evidently perfectly free in the abdominal cavity except for its small pedicle.

The diagnosis is never certain and generally it is not known till the abdomen is opened. It will usually be found impossible to differentiate between solid and cystic tumors unless you can get fluctuation, which is rare on account of the consistency of cyst contents. The diagnosis might be made by aspiration, but this is a procedure entirely unwarranted, because of the disturbance the needle produces, and the fact that the presence of a tumor demands operation whether it be cystic or solid. The most common growths with which these tumors may be confounded are ovarian cysts. This confusion can generally be obviated by examining the patient in the Trendelenberg position, when the intestines gravitating toward the diaphragm greatly facilitates diagnosis. The other conditions

with which confusion may be had are tumors of the pancreas and kidney, also extensive hydrops of the gall-bladder, in which condition the distended and freely movable organ may readily be confounded with mesenteric tumor, but its traceable connection with the liver usually makes the distinction clear. Carcinoma of the stomach or intestines and cysts of the spleen are also to be borne in mind. Floating kidney is especially to be remembered, and a diagnosis of this condition would be well-nigh impossible were it not that when a kidney is sufficiently movable to be confounded with a mesenteric tumor it can be caught up and its renal contour readily made out, and the palpating hand can be pressed into the bed-space where the organ should be normally. Cysts of the spleen cannot be differentiated from cystic tumors of the mesentery, and seldom from solid tumors, unless fluctuation can be determined.

In conclusion, the exact diagnosis is not of vital importance, but the *one important thing is to recognize the presence of a tumor early*, which fortunately is easily done. All tumors in the abdominal cavity demand immediate operation no difference what the growth may be, and the mortality will be lowered by a recognition of this fact and the early surgical treatment of the patient. We all, however, like to make an exact diagnosis, and we should never leave anything unturned in our endeavor to arrive at a correct conclusion, provided we do not jeopardize the life of our patient by so doing. We should always bear in mind the best procedure to insure the patient's safety and future health. After all, the best method to arrive at a correct diagnosis is to hold in mind all the conditions that we might have in any given region and confirm or eliminate them one by one till our conclusion is reached.

The only treatment is removal of the tumor just as soon as it is diagnosed.

REPORT OF CASE.—In the latter part of September, 1904, Mrs. M., aged 26, married, was referred to me for operation. She gave the following history:

Family history negative. Measles at age of 8, no other sickness, and was a strong, healthy girl. Patient says at the age of 12 she noticed a movable "swelling" a little larger than a walnut

in her abdomen just to the right of the navel. It gave her no pain and she thought nothing of it. A year later she began to menstruate and her mother noticed the tumor which was then a little larger. Menstruation was normally established and continued regular every four weeks, lasting three days. She was married in November, 1897, at 18 years of age. Her husband says that he noticed the tumor at that time and it was about the size of a "big apple." Soon she became pregnant and on October 3, 1898, after a normal pregnancy and labor her first child was born. After weaning the baby menstruation was again normal and regular till her second pregnancy, in 1901. On March 13, 1902, the second healthy baby was born after normal pregnancy and labor. This baby, as the first, was nursed by its mother.

During all this time the tumor had grown slowly, but a little more rapidly since the birth of the first child, so that two years after the birth of the second child the tumor was about the size of a cocoanut, freely movable, giving no pain or other inconvenience save from its weight. The growth was not rapid till three months before I saw the patient. During the two months prior to my seeing the case the growth had been very rapid, attended by gradually increasing pain and discomfort, being so severe as to confine the patient to her bed for the month previous to my seeing her. She came into the hospital on a cot on which she was removed from her home in Southern Kentucky.

Examination showed an anemic, cachectic, much emaciated patient, with a nodular tumor occupying all the abdominal cavity from just below the ensiform cartilage to the pubes. Palpation showed a fixed mass of very irregular morphology, with a large, hard, rounded nodule in the umbilical region, the rest of the nodules and depressions feeling rather soft and spongy, but no fluctuation. Vaginal examination showed the uterus to be fixed and continuous with the rest of the tumor as far as I could tell, but it presented the peculiarity of the whole pelvis being full of tumor without any definite form. Heart and lungs seemed good. No constipation but severe digestive disturbance. No vomiting. Pulse 120, temperature 102½.

No diagnosis could be made, but I thought it was probably a multilocular adeno-cystoma of ovary with twisted pedicle, with subsequent inflammatory exudate and consequent adhesions.

The condition of the patient was so bad that I did not deem it advisable to attempt operation at once, thinking that probably the condition was largely due to her long, exhausting train trip, and that a few days' rest would improve her condition. During the next two days she improved very slightly. I then left the city and was gone for five days. I returned October 1st only to find the patient *in extremis*. The tumor appreciably enlarged during absence. Temperature 103, pulse 130, with absolute suppression of the urine, which had existed for the past 66 hours. She had been catheterized repeatedly and not a drop of urine. The patient was put in hot packs, given diuretics, etc., without avail. There were absolutely no symptoms of uremia, so I decided to open the abdomen.

The abdomen was opened 72 hours after the complete suppression had occurred, or about six hours after I returned to the city. As soon as the peritoneum, which was injected and inflamed, was opened, brown mucoid, sanguineous fluid began to pour out. A large, round, solid tumor, appeared at the upper angle of the incision, and from this solid tumor above, conforming to the contour of the abdomen, extending into the pelvis and involving the peritoneum, was the rest of the tumor, which was soft, mushy and slimy to feel; bled at every touch, and exceedingly friable without capsule or other covering, and of a raw, dark red color. This friable portion of the tumor was attached to the solid tumor on either side and below, but not above. The solid tumor was easily separated from the soft portion and its pedicle easily tied off and the tumor cut away. The new growth was then thoroughly explored and found to involve everything; entering the peritoneum at all places just as if it were no barrier to its progress. The parietal, intestinal, uterine and tubal peritoneum were all encased in the growth, which filled the entire lower cavity. This new growth was torn away in handfuls to the extent of a wash basin full. The growth resembled a partially organized blood-clot mixed with slimy mucus, more than anything I can think of. Not more than half of this new growth was removed, because the hemorrhage was so profuse and the futility of getting it all away so apparent. What was removed was done so chiefly out of curiosity and hoping to relieve the pressure from over the ureters to see the

effect on the kidneys, believing from the symptoms that I had a pressure anuria to deal with. The cavity was then packed with gauze to control hemorrhage and the ends of the compression packs brought out of the lower angle of the wound, and the abdomen closed. The patient was almost dead from hemorrhage and shock at the stopping of the operation.

Saline was given under the breasts all during the operation and after the patient was put to bed she rallied under strong stimulants and lived for five days.

One of the most interesting features of the case is the fact that in the first twenty-four hours after operation she secreted 12 ounces of urine, 23 ounces the next, and 25 the following day. It was not measured after that, but there was no further suppression till death.

The patient was so much better on the second day that I hoped for sufficient recovery for her to get about again. My hopes were dispelled on the third day by finding my dressings still saturated with the same bloody, slimy fluid that ran from the abdomen on the day of operation. This flow continued without any abatement at all till the patient died of exhaustion five days after operation.

Post-mortem was refused. The solid tumor was round, fifteen cm. in diameter, and weighed 3.7 kg. (about 8¼ lbs.). It had a peritoneal covering except about one-third of the lower side, which was deperitonized by the new growth. The pedicle, which was about two inches wide and one inch thick, was almost identical in structure with the new growth and was apparently the channel of the new growth reaching the cavity.

On splitting the solid tumor open it was found to be fibroid with necrotic degeneration in its center, surrounded by a glistening, grayish white tissue zone which extended into the pedicle and replaced the fibrous tissue of the lower part of the tumor and that part which lay towards the symphysis. Microscopic sections showed the tumor in the non-degenerated portion to be fibroid with small pale nuclei showing poor nutrition. The degenerated new growth, on the other hand, showed masses of vigorous round cells having large clear nuclei with numerous mitotic figures, indicative of rapid growth and characteristic of round-celled sarcoma. The new growth seemed to have sprung

from the pedicle and presented the same microscopic picture as the sarcomatous portion of the original tumor; the cells however, had a decidedly more embryonic look than the former.

This tumor was the most malignant growth I ever saw and the sarcomatous degeneration must have occurred during the last few months, and before that time was a benign growth that could have been easily removed and the patient's life saved.

The lesson is the old story, but forcibly retold. Had the patient not carried this tumor for years, but submitted to operation sooner, both the pathology and termination of this case would have been changed.

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The above are among the more important articles. No attempt at a complete bibliography has been made. References to cases reported are given in Table I.

CHYLOUS CYSTS OF THE MESENTERY.

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THE basis of this paper consists of a study of the literature on the subject, including the reports of nineteen cases which I have been able to collect, together with one case which occurred in my own practice, of which the following is the report:

J. W., age 22, male. Referred by Dr. A. H. Mouser, of Latty, Ohio. Patient's father was killed by lightning, mother living and well. Both maternal grandparents died of pulmonary tuberculosis. Commencing when he was ten years of age, the patient had numerous attacks of pain in the right lower quadrant of the abdomen. Two years prior to my visit he had a severe attack, which lasted for three months. After that attack he remained well for some months, when he had a milder attack, which lasted a week. This last attack was in July, 1904. In February, 1905, the pain came again and continued intermittently until May 3 of the same year, when I saw him with typical symptoms of obstruction of the bowel. There was a tumor in the right iliac region. Tenderness was not marked and was rather diffuse. The abdomen was markedly tympanitic, and there was no localised muscular rigidity. A diagnosis of appendicitis had been made by Dr. Mouser, in which I concurred. On opening the abdomen through the right rectus a group of chylous cysts was found, together with a volvulus involving that portion of the ileum attached to the mesentery in which the cysts were found. The number of cysts of itself precluded treatment by drainage, their enucleation could not be accomplished without serious danger to the integrity of the gut, besides the vitality of the gut had already been nearly, if not quite, exhausted by the twist. Hence excision of the bowel, together with the mesentery containing the cysts, was done and an end-to-end anastomosis made with the aid of a Murphy button. The abdomen was closed without drainage.

The patient did well until the night of the sixth day, when he commenced to complain of abdominal pain, and died within twelve hours.

A post-mortem examination showed leakage at the mesenteric attachment at the point of anastomosis. The union was perfect throughout the rest of the circumference of the gut. No signs of peritonitis. The button was loose in the gut save for a minute shred of tissue which still held. Figures 1 and 2 are drawings made from the specimen.

Literature.—The literature on the subject so far as the text-books are concerned is very meager. Sutton¹ devotes ten lines to the subject of chyle cysts and Douglas² the same space. Greig Smith³ devotes less than four pages to the entire subject of mesenteric cysts, including their treatment, while Maylard⁴ does not mention the subject. In Treves's "System of Surgery" and in the "International Text-Book of Surgery" will be found the best text-book articles I know of on the subject, but both are very short and imperfect. The current literature contains comparatively few articles upon chylous cysts. Among those which I have found I will mention Bramann's,⁵ Fetherston's⁶ report of a case with the discussion thereon; Mendes de Leon's⁷ and Rasch's⁸ with the discussion. Moynihan in his excellent paper⁹ on "Mesenteric Cysts" devotes three and a-half pages to chylous cysts. Dowd¹⁰ in his paper bearing the same title gives less than two pages to chylous cysts. Carson¹¹ of St. Louis read a paper upon "Chylous Cysts of the Mesentery" before the American Medical Association in 1889. Unjenim and Petroff¹² wrote an excellent paper on the subject and collected all the cases they could find in the international literature.

History.—The history of the development of this subject was until recently inextricably bound with the history of mesenteric cysts in general, and even now this is true in a great degree, though in later years, as our knowledge has grown, a separate study of chylous cysts has been made by a few writers. Cysts of the mesentery were first classified by Portal in 1803. Dowd¹⁰ in his article gives reference to 145 cases of cyst of the mesentery of the various kinds. Unjenim

and Petroff¹² in 1889 reported the first case of chylous cyst in Russian literature and collected nine other cases from international literature. When Bramann's case was operated (1886) no other case was recorded which had been treated surgically. Kilian¹³ reported in 1886 a "lymph-cyst" treated surgically; this was two months later than the Bramann case was operated, but before its publication. Carson's case was the first one reported in America, so far as I know, and the largest that had been reported at that time in any country. Rasch was of the opinion that his was the first case of chylous cyst, occurring in a woman, published, but in this he is mistaken, for Kuester and Werth each operated upon a woman in 1882, while the Russian case above referred to antedated that of Rasch a year and Pitman's case was reported¹⁴ in 1857.

Frequency.—Chylous cysts of the mesentery belong to the surgical rarities. When Carson wrote his paper he was able to collect eleven cases, and the writer has been able to find but nine more, including his own, making in all twenty cases. One of these (Eppinger's) is perhaps doubtful, as he reported it as a dermoid cyst, but Werth considered it a chylous cyst.

Concerning the relative frequency of serous and chylous cysts there is considerable difference of opinion among writers. Hahn¹⁵ says that serous cysts are the more common, while Smith¹⁶ and Dowd¹⁰ say that chylous cysts are the more common. In my own research in current literature I have found twenty-nine cases of serous cysts and twenty cases of chylous cyst and am, therefore, forced to side with those who think the serous cysts more common.

Pathology and Etiology.—Dowd¹⁰ in speaking of the origin of chylous cysts says: "Taking these cysts together it seems pretty well established that the chylous cysts are pre-formed cysts, situated in such close relation to the lacteals that chyle has been effused into them and that they are really of embryonic origin; in structure similar to ovarian and par-ovarian cysts."

The microscopic examination of the specimen removed from Rasch's patient seemed to show in this case that the tumor originated from the rupture of a chyle vessel probably produced by trauma, and in the discussion of this paper Doran

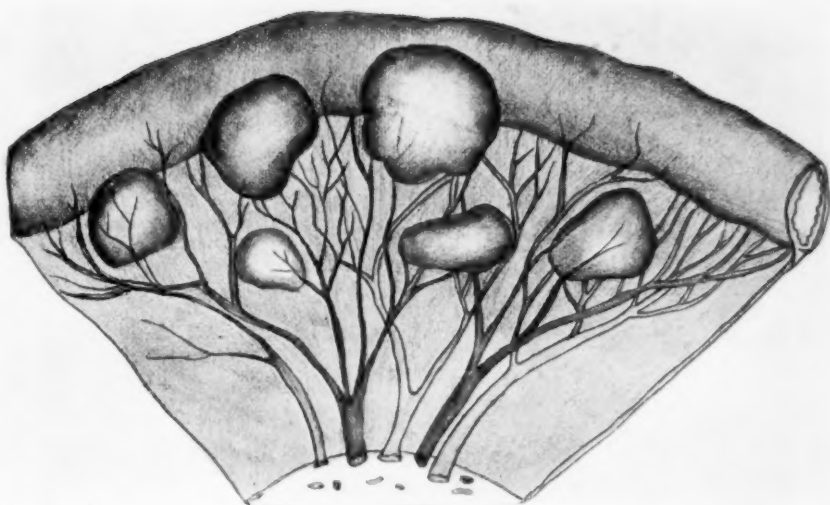


FIG. 1.—Author's case. Showing bowel with mesentery and cysts excised. Multiple.



FIG. 2.—Drawn from transverse section through specimen from author's case. Showing flattening and compression of bowel by cyst.



FIG. 3.



FIG. 4.

agreed entirely with this view. Upon similar evidence it was determined that Fetherston's case⁶ originated in a lymph gland. The specimen from Bramann's case⁵ presented no endothelium nor epithelium on the inner surface of the cyst wall and originated most probably, as did Rasch's, from the rupture of a lymph vessel. According to Carson¹¹ eight of the cases collected by him were due to degeneration of lymph glands and three to dilatation of lymphatics. Von Blum suggests as a common origin typhoid or tubercular degeneration of mesenteric glands.

That a few cases of chylous cysts have been reported which had their origin in the dilatation of the receptaculum chyli or large retro-peritoneal lymphatics there can be no doubt, but cysts having this origin are not likely to occupy the mesentery but are usually in close contact with the spine, as in the case reported by Scharlemmer.¹⁷ In my own case there were several distinct and relatively widely-separated cysts. Chemical and microscopical examination of the contents of the cysts proved it to be chyle. The report of the microscopical examination of the specimen, made by D. J. B. McEvoy is as follows:

The gross specimen submitted for examination consisted of a portion of intestine about four and one-half inches long with attached mesentery. In the mesentery there were several cysts from which the fluid had been evacuated.

The specimen illustrated in photograph number 3, was taken from the wall of a large cyst next to the bowel. A cube was removed from the floor of this cyst next to the intestine and included a portion of the bowel wall which was continuous with the base of the cyst. Microscopical examination of this cube shows a great increase in the lymphatic tissue of the bowel wall. The bowel mucosa still shows the outline of the secreting glands, which are normal to the part, but the epithelial lining has been destroyed and the lumen filled with lymph-cells. These lymph-cells also distend the periglandular structure. In some places we find a layer of lymph-cells covering the mucosa. Beneath the mucosa, infiltrating the muscular layer of the bowel and extending upwards to form the floor of the cyst, was a mass of lymphatic tissue consisting of cells in all stages of amoeboid movement.

Photograph number 4 was taken from a section of an enlarged mesenteric gland in the vicinity of the cyst.

Microscopical examination shows capsule to be intact. The structure does not differ from the normal gland except we find a general hyperplasia of all the elements.

The photograph shows the lymph spaces of the periphery and compact masses of lymph tissue below.

These micro-photographs were made with the low power to include a wide field.

Undoubtedly, then, we are warranted in coinciding with Moynihan⁹ in the opinion that the origin of chylous cysts is manifold, and disagreeing with Dowd¹⁰ when he says that they are all embryonic in origin. It naturally follows that there can be nothing constantly distinctive in the pathology of chylous cysts of the mesentery except their contents and their location between the folds of the mesentery. Microscopically glandular endothelium will be found in cysts originating in degeneration of lymph-glands and endothelium in those originating from dilatation of lymph vessels; provided, however, atrophy of these elements has not resulted from pressure. Naturally those cysts arising from rupture of lymph-vessels will not present endothelium on the inner surface of their walls.

These cysts may be unilocular or multilocular, single or multiple. Multilocular chylous cysts may undoubtedly become unilocular by pressure-absorption, just as obtains in ovarian cysts. It is also possible for multiple cysts to become by this same process first multilocular and single and finally single and unilocular.

In appearance these cysts are usually creamy white and have large vessels traversing their walls. Accidents such as volvulus, hæmorrhage into the cyst or cyst-wall and peritonitis may change their color and render the vessels indistinct. Usually these cysts have no distinct pedicle, but they may have. The relation of the bowel to the cyst varies much. The accompanying illustrations (Figs. 5, 6, 7, and 8) show some of the varying conditions that have been noted along these latter lines.

Diagnosis.—An exact diagnosis is practically impossible, neither is it necessary. It goes without saying that one cannot have any idea of the character of the cyst contents until he sees it, unless tapping is resorted to, and this proceeding is to be condemned.

Developing in the mesentery of the small intestine, as the large majority of these tumors do, their location and

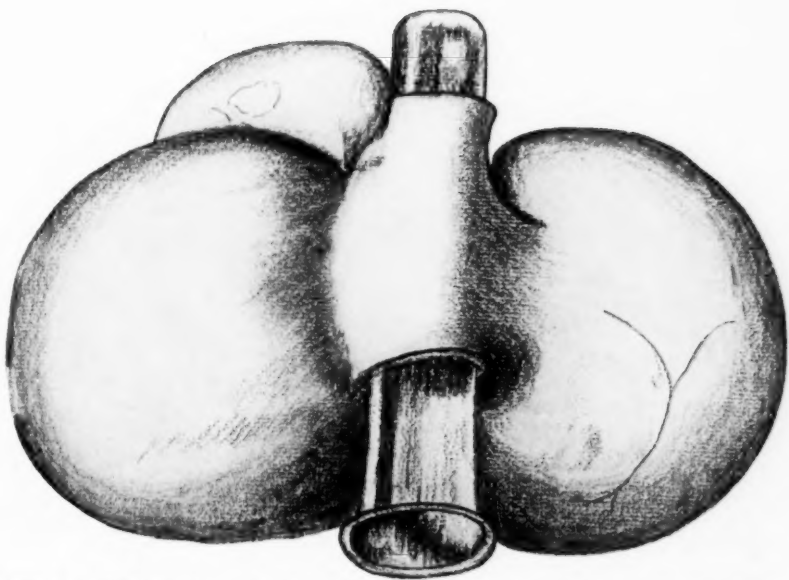


FIG. 5.—From Moynihan, *Annals of Surgery*, Vol. XXIV. Tube passes through gut.

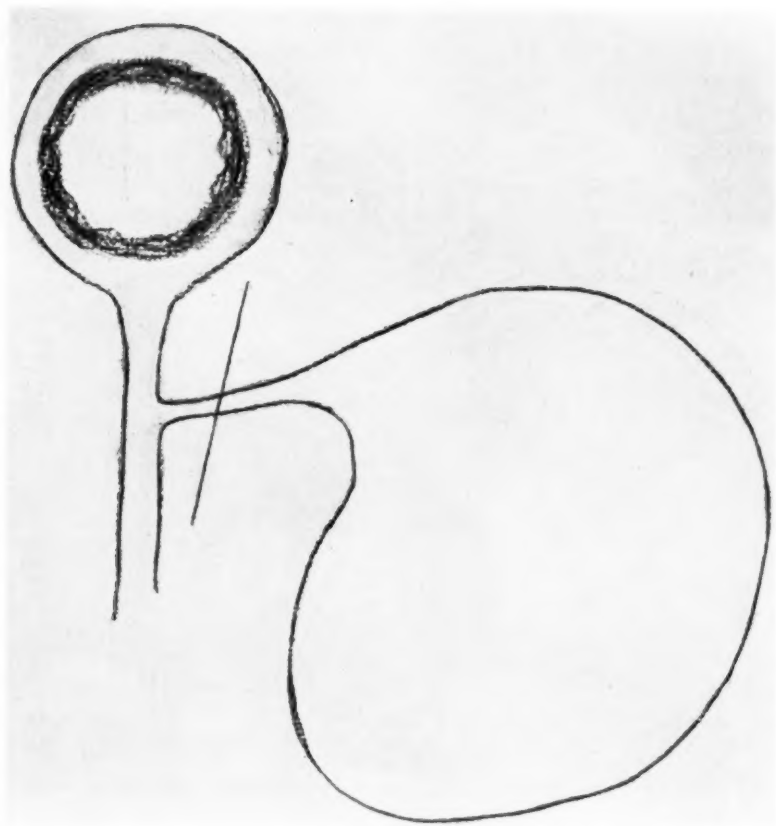


FIG. 6.—From Moynihan. Showing cyst with pedicle. Gut was strangulated from traction on pedicle. Unilocular.

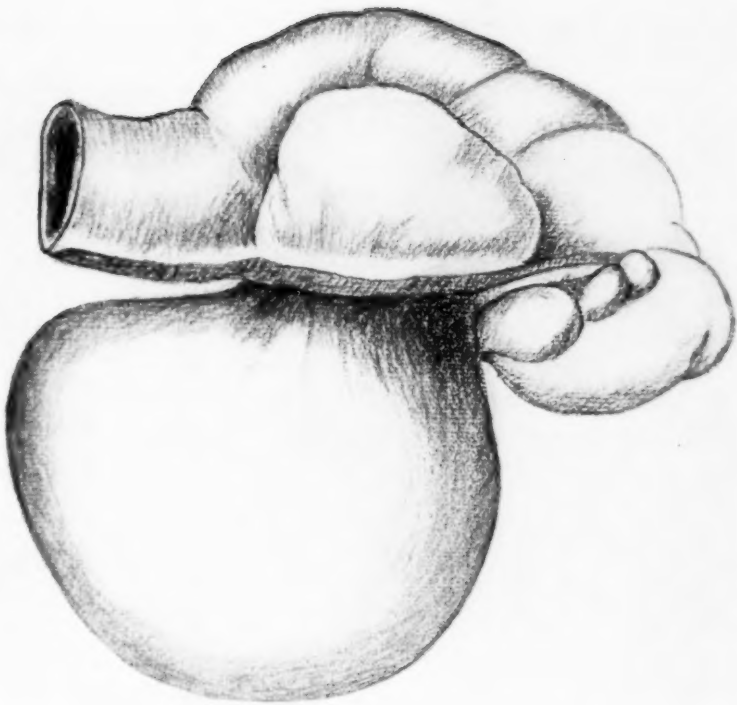


FIG. 7.—From Moynihan, Multilocular cyst.

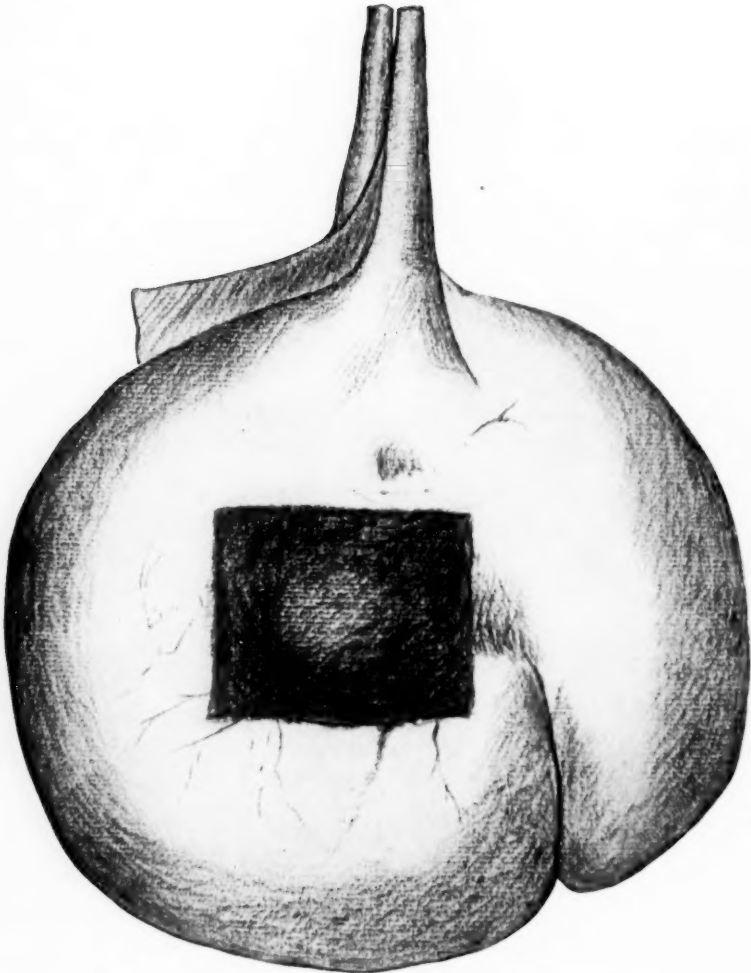


FIG. 8.—Robson's case. From Moynihan. Small pedunculated cyst.

attachment, when the latter is determinable, is somewhat distinctive. A centrally located, movable, fluctuating tumor would raise a strong suspicion of mesenteric cyst, and if the tumor were crossed by a portion of intestine the suspicion would become a conviction. Cysts of the mesentery more often cause abdominal pain than do any cystic abdominal tumors. Hence the diagnostic significance of pain in these cases. The same thing may be said of vomiting, also. Especially significant are these symptoms if unaccompanied by signs of infection or other complications. Von Blum¹⁸ was the first to call attention to the diagnostic significance of recurring attacks of volvulus in mesenteric cyst. The patient whose case he reported had had five or six attacks prior to time of operation. This was true of my own case and also of several others of which I have read the reports.

Recurrent attacks of belly pain, accompanied by symptoms of bowel obstruction in a case presenting a centrally attached abdominal tumor, would strongly suggest mesenteric cyst.

Chronic increasing obstinate constipation is not infrequently present in these cases and is due to the stretching and flattening of the bowel as it crosses the cyst.

The age of the patient is of little or no diagnostic importance. A number of cases under ten years are reported, but the average age in fifteen cases was found to be over thirty-four years.

The frequency with which the history of trauma is given by these patients would seem to show that this might be of some aid in differential diagnosis. In some cases, as in my own, for instance, where there were a number of relatively widely separated small cysts which produced no appreciable tumor until volvulus resulted, even an approximately correct diagnosis will not be possible before the abdomen is opened.

With care, however, the diagnosis of mesenteric cysts may be made in the majority of cases, though the character of the cyst contents cannot be determined until the abdomen is opened.

Treatment.—That mesenteric cysts of all kinds seriously endanger life there can be no question, hence there can be no

question but that their removal as soon as the diagnosis is made is the only proper line of treatment to follow. As to exactly what method should be adopted in their removal there is great difference of opinion, but it appears evident that this difference arises from the fact that conclusions have been reached from too narrow premises. Those cysts which have a well-defined pedicle are best removed after ligating the pedicle, as in ovarian cysts. Others may be easily and safely enucleated; others will be best treated by stitching the open sac to the parietal peritoneum and draining.

The fear entertained by some, and very naturally, that there might be danger of a permanent chylous fistula in cases treated by drainage has proven unfounded.

There are other cases in which resection of the bowel, together with that portion of the mesentery containing the cyst or cysts, will be required. Such a procedure seemed best in my case. Drainage was out of the question because of the number of the cysts, while either enucleation or excision would certainly have led to gangrene of the bowel.

CONCLUSIONS.

1. Chylous cysts of the mesentery are to be classed with the surgical rarities, being less common even than serous mesenteric cysts.

2. Many chylous cysts of the mesentery begin as multiple cysts, later become multilocular and finally unilocular by the process of pressure-absorption.

3. The origin of chylous cysts is manifold and the microscopic pathology varies equally.

4. Trauma seems to be a causative factor in quite a number of chylous cysts.

5. Diagnosis of cyst of the mesentery may be impossible, but in the majority of cases can be made before opening the abdomen, but the character of the cyst contents cannot be determined by any safe procedure until the belly is opened.

6. The treatment of chylous cysts of the mesentery consists in their removal by that technic which seems best adapted to the case in hand after it has been studied through the open abdomen.

TABLE OF CASES.

No.	Reporter.	Where Reported.	Age.	Sex.	Origin.	Operation.	Result.	Remarks.
1	Bramann.	Langenbeck's Archiv., Vol. 35.	63	M.	Receptaculum chyli of mesentery.	Incision, walls stitched to skin and drained.	R.	Tumor was size of child's head.
2	Kilian.	Berlin. K. Woch., Nov. 25, 1888.	61	F.	Thoracic duct.	Incision and drained.	R.	Had been tapped twice and refilled (4700 cc. chyle withdrawn).
3	Kuester.	Ein Chir. Erkenntniss, Berlin, 1882.	21	F.	Between folds of mesentery.	Extirpation.	D.	Death due to peritonitis from wounding bowel. Size of adult head
4	W.	Milliard and Tilhaut's paper, Berlin. K. Woch., 1887. No. 23.	31	M.	Degenerated mesenteric gland.	Extirpation.	R.	Kidney size.
5	Werth.	Archiv. f. Gynecol., 1882. Vol. 19.	?	?	Mesenteric gland.	Extirpation.	R.	Size of child's head.
6	Wyenin and Petroff.	Dhevnik Kazans Kaho Obsch. Watchis, Nos. 7 and 8, 1888; also London Med. Record, Aug. 20, 1888.	26	F.	Mesenteric glands.	Extirpation.	R.	Case was Wyenin and Petroff's, operated by Fenominoff.
7	Carson.	Jour. A. M. A., May 10, 1890.	42	M.	Not known.	Incision and drainage.	R.	Large as adult head. Wall very thick and hard.
8	Moynihan.	ANNALS OF SURGERY, July, 1897.	18	F.	Mesentery of ileum.	Enucleation.	R.	Operated in second attack of pain, tenderness and vomiting.
9	Moynihan.	ANNALS OF SURGERY, July, 1897.	7	M.	Mesentery of ileum.	Pedicle ligated and cyst removed.	D.	Pain, tenderness and vomiting were symptoms.
10	Syms.	ANNALS OF SURGERY, Vol. 23, p. 605.	19	M.	Mesentery of ileum.	Cyst enucleated, mesentery closed.	R.	Contained 14 ounces of chyle.

TABLE OF CASES—Continued.

No.	Reporter.	Where Reported.	Age.	Sex.	Origin.	Operation.	Result.	Remarks.
11	Eppinger.	By Carson in Jour. A. M. A., May 10, 1890.	Not given.	Not given.	Not given.	Found post mortem.	....	Reported as dermoid, but regarded as chylous by Werth.
12	Rosch.	Trans. London, Obs. Soc., 1889.	27	F.	Mesentery of small bowel.	Cyst stitched to abdominal wall and drained.	R.	Six pints of chyle. Pain in belly led to discovery of tumor.
13	Mendes de Leo.	Amer. Jour. Obs., Vol. 24, 1881.	27	F.	Not given.	Cyst opened, stitched to abdomen, drainage.	R.	Tumor very movable and caused severe pain.
14	Fetherston.	Australian Med. Journal, 1890. New Series, No. 12.	33	F.	Mesentery of ileum.	Well-formed pedicle, transfixed and tied.	R.	Three pints chyle. Had had several severe attacks of belly pain. Glass drainage in abdomen.
15	Porter.	Present paper.	22	M.	Mesentery of ileum, degenerated lymph-glands.	Excision of cysts with bowel, anastomosis with Murphy button.	D.	Died from small leakage of mesenteric attachment, which occurred on seventh day. Numerous attacks of belly pain.
16	Rokitansky.	Lehrbuch der Pathol.	53	M.	Mesenteric gland.	Found post mortem.	....	Walls of cyst thick and flabby. Contents inspissated chyle, cinnamon brown in color.
17	Enzmann.	Basle Quing. Dis.	77	F.	Thoracic duct.	Patient died of endocarditis.	....	Several small cysts with thick walls and white contents, and one size of child's head, lobulated and containing rosy fluid with glutinous red and black lumps.
18	Rokitansky.	Lehrbuch der Pathol.	36	M.	Mesenteric gland.	Found post mortem.	....	Multilocular.
19	Virchow.	Berlin. K. Woch., Nov. 14, 1887.	Not given.	Not given.	Not given.	Post mortem.	....	Patient died of peritonitis due to bowel obstruction.
20	Pitman.	Brit Med. Jour., May 16, 1887.	23	M.	Mesentery of small bowel.	Post mortem.	....

SUMMARY OF TABLE.

Whole number of cases reported, 20.

Number operated upon, 14.

Total deaths in operated cases, 3.

Number of cases treated by excision or enucleation of cyst, 8, of which 6 recovered and 2 died.

Number of cases treated by incision, stitching sac to abdomen and draining, 5, all of which recovered.

One case treated by excision of cyst, mesentery, and bowel, died.

Only 6 cases were found reported post mortem, which would seem to prove that when present chylous cysts of the mesentery usually manifest themselves by symptoms sufficiently pronounced to lead the host to consult a physician.

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- ⁹ ANNALS OF SURGERY, vol. 24, p. 1.
- ¹⁰ ANNALS OF SURGERY, vol. 32, p. 515.
- ¹¹ Jour. A. M. A., May 10, 1890.
- ¹² Dhevink obsh vrach g. Kazans, Nov. 7 and 8, 1889, and London Med. Record, Aug. 20, 1889.
- ¹³ Berlin Klin. Woch. S. 407, ff.
- ¹⁴ Brit. Med. Jour., May 16, 1857.
- ¹⁵ Medical Record, Sept. 24, 1887.
- ¹⁶ Abdominal Surgery, Vol. 2, p. 1065.
- ¹⁷ American Medicine, vol. 6, p. 103.
- ¹⁸ Jour. of the A. M. A., Jan. 11, 1902, p. 139.

PERFORATING DUODENAL ULCER.

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J. S., aged 38, came to the Montreal General Hospital at 6 P.M., November 15, 1905, stating that while driving his express wagon that afternoon he had been seized with severe pains in the epigastrium. Associated with this pain, which came on quite suddenly there was violent retching and vomiting. He does not know the character of the material vomited, and says he was quite "out of his mind" on account of the agony he was in. There had been no previous history of illness, except an attack of abdominal pain eight years ago, which confined him to bed for a few days and kept him from work for about a month. He is not very clear about the details of this illness, but does not think he had any vomiting at that time. No illness since except indisposition following a "spree" or from a temporary bronchitis. Has used tobacco a great deal since youth, and up to three months ago had been a pretty heavy drinker, but for the past three months has abstained entirely from alcoholic beverages. He is a married man, with a healthy family, and his clinical history is good.

Condition on Admission.—Tall, well built, strong man; complains of constant lancinating pain in the abdomen, with maximum intensity over the ensiform cartilage. He has vomited several times since admission, always accompanied by very severe retching, and the last two or three times vomitus has been well tinged with bright blood. There is no marked shock; temperature 99°; pulse 72; respiration 24. There is no evidence of any mental disturbance, and reflexes are normal. There is a very slight pallor; extremities somewhat cold; no œdema. No evidence of any hernia. Heart and lungs negative; chest emphysematous. He complains constantly of very severe pain. The abdominal wall is well retracted, and the muscles stand out on

both sides symmetrically. There is most marked rigidity throughout the abdominal area, a little more pronounced, perhaps, in the epigastrium. No mass can be felt. Palpation elicits generalized pain only, nothing local; on percussion the note is fairly tympanitic throughout, the right flank being somewhat less resonant than any other portion. The liver dulness is about normal, although the lower margin cannot be palpated. On account of the extreme agony of the patient it is rather difficult to conduct a satisfactory examination, but there appears to be a dull area in the hypogastrium, which it was thought might be due to a distended bladder, but which did not disappear upon passing the catheter. A hypodermic of morphia, $\frac{1}{4}$ gr., was given, heat applied to the extremities, and the case watched carefully for a time.

When the patient was seen again, about nine o'clock that evening, the temperature had gone up to $100\frac{2}{5}^{\circ}$, pulse 96, and there was distinctly more rounding up of the abdomen, with an increase in the dull area in both flanks. The board-like rigidity of the abdominal muscles still persisted. Vomiting, too, was still present and in the vomited mucus there was a little fresh blood. A diagnosis was made of perforated gastric ulcer, notwithstanding the fact that there had been no previous history of digestive disturbance. Operation was decided upon and carried out at once.

After the usual preparation, and under ether anæsthesia, a median incision was made extending down from the ensiform cartilage towards the umbilicus, and upon opening the abdominal cavity free gas escaped. It was then found that the pyloric end of the stomach and the first part of the duodenum were adherent to the under surface of the overhanging liver. There was very little inflammatory reaction present, but upon separating these two adherent organs, a round perforation was found in the duodenum about three-fourths of an inch from the pyloric valve. It was situated in the anterior wall of the duodenum and was of sufficient size to admit an ordinary lead pencil. It was clean, punched-out, with apparently very little undermining or erosion of the neighboring mucosa inside. The duodenum was brought out through the incision and the ulcer closed by simple suture, without excising its borders. The closure of the ulcer did not encroach upon the

lumen of the gut sufficiently to indicate a pyloroplasty. A reinforcing row of Lembert sutures were then introduced, and, for the sake of further security, a portion of the gastrohepatic omentum was sutured down over the site of the perforation. Looking down towards the lesser sac there appeared to be very little pus or other inflammatory material, and it was very easily wiped out and the parts returned to their normal position.

The next step in the operation was to make a counter opening in the abdominal cavity below the umbilicus in the median line, and here we came upon a very different state of affairs. The great omentum, coils of intestine, and the peritoneum generally, were very much reddened and injected, and large quantities of sour-smelling, seropurulent material were found filling all the spaces below; and especially had it gravitated down into the pelvis and also into the flanks. A large drainage-tube was introduced here, and a stream of warm (105°) normal salt solution introduced through the upper wound and allowed to flow freely out here. With this drainage-tube passed well down into the pelvis, giving free egress to the flow of water coming in through the upper opening, the abdominal cavity was thoroughly irrigated. Many particles of food which had been taken at the midday meal, notably some pieces of corn, pieces of potato, etc., could be identified as they came out of this lower wound. After irrigating till the water returned perfectly clear, a large drainage-tube was inserted down into the pelvis; the upper wound was closed in the usual way, without drainage, and the lower one down as far as the drainage-tube. The abdomen was left as full as possible of the normal saline solution, and the patient returned to bed, the head of which was raised about $1\frac{1}{2}$ feet, so that the abdominal contents might gravitate towards the drainage-tube which was left in the pelvis. ("Postural Drainage.") The contents of this tube were aspirated out every hour for the next 24 hours. The patient recovered very well from the shock of the operation and was fed entirely by rectum for four days. The post-operative temperature never at any time exceeded 101° , and became normal on the third day after operation and remained so until the recovery of the patient.

The convalescence was rapid and quite uneventful in every way. The drainage-tube was removed on the fourth day as the

discharge had ceased, and moreover the cultures from the peritoneal cavity, taken at the time of operation, were returned by the bacteriologist with a diagnosis of "no growth." Patient left the hospital on October 5, and since then has been in normal health and is now following his usual vocation of express driver. He is able to eat anything that he wishes, although cautioned against excesses in any form.

Some interesting points in this case are: (1) The fact that a perforating duodenal ulcer was present without any previous symptoms in a man apparently strong and healthy. (2) That with a perforating duodenal ulcer one may get bright red blood in the vomited material and thus point to a diagnosis, as in this case, of perforating gastric ulcer. The absence of previous gastric symptoms may be explained by the fact that this was a duodenal ulcer and not a gastric one; although, contra, it is a well-known fact that duodenal ulcers do give gastric symptoms. One is here reminded of the remark attributed to one of the Mayos, that, "in operating upon gastric ulcer it is always well to make the incision *to the right of the median line*, as the majority of gastric ulcers are duodenal." Mr. Caird, of Edinburgh, in his address before the Canadian Medical Association at its Halifax meeting last summer, pointed out the frequency with which gastric ulcer affected the pyloric region, as distinguished from all other parts of the stomach; and one can easily fancy that whatever the etiological condition was that might produce a gastric ulcer on one side of the valve, the same condition might very easily produce it a few centimeters on the other side. So that it is hard to draw a hard and fast line between gastric and duodenal ulcer; in fact, often clinically impossible.

As regards the operation itself, it was a good illustration of the necessity of following a surgical rule in any given operation. The well-known rule in operating upon gastric perforation, where there has been possible escape of stomach contents, is that the operator should always make a counter opening *below the umbilicus* in order to determine the condition of the general abdominal cavity. Had we failed to do so in this case we would most assuredly have lost this patient by

subsequent general peritonitis. The condition of the peritoneum at the site of the perforation appeared to be so good that one could have scarcely believed that the state of affairs further down in the abdominal cavity should have been so shocking as we found it to be when we made the second opening. This case is, further, an illustration of the good result that follows early operation, a point which Mr. Caird's series of cases so well proved. The delay in operating upon this case was not to give time for shock to pass off, there being little shock present; but was entirely due to the fact that the patient at first absolutely refused operation, and only consented upon the solicitation of his relatives and his spiritual adviser, all of whom had to be summoned to the hospital. I am quite convinced that had we delayed operation until the morning, a fatal general peritonitis would have supervened.

PRACTICAL POINTS IN THE SURGERY OF THE LARGE BOWEL, EXCLUSIVE OF THE RECTUM.¹

WITH ILLUSTRATIVE CASES.

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No effort will be made to determine the ultimate fate of the class of cases dealt with in this paper, its object being to indicate what the author has found clinically the best practice when an operation has, for adequate reasons, been decided upon, and the various expedients at our disposal when dealing with complications.

I shall deal with certain conditions and illustrate them practically, not theoretically, by briefly rehearsing the history of an appropriate case, with some comments on technique.

I shall sedulously endeavor to omit all non-essential details, only emphasizing such points in the history of my cases, or the operative technique, as exemplify the facts upon which I desire to lay stress, which in brief are: (1) What can and should be done in certain classes of cases; (2) Why that which is most desirable in theory is sometimes both inexpedient and impracticable as a primary measure, although it can be resorted to successfully later; and (3) how purely palliative operations, under certain circumstances, will secure safely all the benefits that a more dangerous radical procedure offers.

My first contention is that there are a certain number of the most desperate cases of perforative peritonitis of appendicial origin which can be saved for later radical procedures, provided much operative interference is avoided at the outset. How often have I regretted an exhaustive search for a perforation in cases where my surgical instinct should have taught

¹ Read in its present form before the Saginaw County Medical Society, Michigan, December 5, 1905.

me to simply drain, giving a possible chance for a late operation, instead of preventing any possibility of a late intervention by killing my patient in attempting to do an ideally complete operation. It is because it is so much harder to decide when *not* to do a given thing than when *to do* its opposite, that many of our operations fail to do any of the good that they are capable of effecting.

CASE I.—The patient, C. B., aged 20 years, was admitted to the University Hospital October 22, 1903, on the 21st day of an attack of appendicitis, with what appeared to be generalized peritonitis. The boy was in such a desperate condition it seemed hardly proper to intervene, but a rapid draining operation was decided upon and the usual oblique incision on the right side gave vent to large quantities of free pus intermixed with gas bubbles. My assistant made a corresponding opening on the left side and a stab wound in the same loin posteriorly, while I duplicated this on the right side. The bowel beneath my first wound was apparently gangrenous. The whole abdomen seemed to be full of pus, and was flushed out with many gallons of hot salt solution, and rubber-tube drains were passed through all four openings, with an additional cigarette drain placed in the deep pelvis, and a strip of iodoform gauze carried up to the under surface of the liver. These last two drains were removed in forty-eight hours, when all four openings gave exit to fecal matter. After a hard struggle the boy recovered enough to be walking about the wards, but the fecal fistula would not close. Accordingly on January 22, 1904, the abdomen was entered and the adherent margins of the opening into the bowel were separated from the abdominal parietes. In separating some adherent loops of small bowel three perforations were made, two of which were at once closed by a double row of sutures, one including all the coats, the others being seromuscular. The third perforation was just below the ileocæcal valve, the large opening into the colon being just above the valve, leaving only a bridge of tissue between. I therefore resected a V-shaped portion of the colon and ileum, including the ileocæcal valve, and united the cut edges transversely by a row of through-and-through stitches, which were then buried by interrupted seromuscular sutures, reinforcing

the anastomosis by lightly catching the omentum down over it by a few stitches. After a rather serious course he convalesced, leaving the hospital March 7, 1904, well.

A search for the opening or openings at the first operation would undoubtedly have killed this lad. Still further, could the gangrenous areas of bowel have been quickly and easily reached, no stitches would have held, extensive resection would have become requisite, and the patient, I am confident, could not have survived any such procedure; but by free drainage and irrigation he was preserved for a successful secondary resection.

The second case which I shall quote is one which probably will be claimed by some to also show how previous chronic lesions, such as old ulcers of the gastro-intestinal tract, frequently serve as starting points for malignant disease. This case also shows that even the experienced practitioner, still more the tyro, should carefully consider all possibilities in every case of trouble located in the right iliac fossa, and not off-hand decide that every patient suffering from pain and a mass in this region has appendicitis.

CASE II.—C. W. B., aged 65 years. Entered the University Hospital March 15, 1904. His history in brief was, that he had had pain in the appendicular region with a tender mass detectable by palpation just outside the crest of the ilium. This mass was dull on percussion, smooth, somewhat movable and was said to disappear at times, by which was probably meant that difficulty was experienced in recognizing it, owing to its change of position from distention of the bowels with flatus and the consequent increased rigidity of the abdominal muscles, which were always somewhat tense. He had had two alleged attacks of typhoid fever when serving in the army during the Civil War; diarrhoea, lasting three or four months, followed each attack, succeeded by pronounced constipation, which latter symptom persisted up to the time of onset of the present trouble. This was sudden, consisting in a severe attack of pain in November, 1902. This lasted but a few hours, but in February, 1903, another more severe attack occurred, a small tumor being detected by

his physician the next day. Neither fever nor vomiting ever occurred during these or the subsequent attacks, which were frequent, but during the intervals some pain and the tumor persisted. In May, 1903, a severe attack of pain led his physician to prepare him for an appendectomy, but rapid improvement led to postponement of any operative interference. His old constipation gradually increased, but there has never been any pronounced symptoms of obstruction, unless the paroxysms of pain resulted from interference with the free passage of flatus and feces. Since the latter part of December, 1903, the right-sided pain has been worse and interfered with his sleep. A diagnosis of carcinoma of the cæcum was made, founded chiefly on the presence of a steadily enlarging but movable tumor unattended by fever, and the symptoms of what was believed to be partial obstruction. March 21, 1904, by an incision parallel with the right rectus muscle, after an exceedingly difficult operation of over two hours' duration, the caput coli, the ascending colon and some inches of the ileum with numerous mesenteric lymph-glands and much infiltrated mesentery were removed, and the cut ends of the intestines were united by several rows of interrupted silk sutures, the first including all the coats of the bowel, the others being seromuscular. The omentum was brought over the line of suturing and a cigarette drain introduced. Despite the formation of a slight fecal fistula, recovery promptly took place, the patient leaving the hospital May 24, the wound soundly healed; when last heard from he considered himself well. The technique in this and the succeeding operations being in no way peculiar, the details are omitted.

The next four cases present certain features in common to which I would call attention. There were widespread adhesions between the neoplasm and other viscera, the cases where the bladder was concerned demonstrating its involvement by suggestive symptoms before operation. Adhesions of a neoplasm to other organs seem to be at times purely inflammatory and do not necessarily mean neoplastic infection, although this is too often the case. To properly deal with either malignant or tubercular processes within the abdomen it is often impossible to avoid superficial or even penetrating

damage of the hollow viscera, but this can be readily repaired and should not deter us from radical procedures. Again, the admirable advice to resect the mesentery in such a way that a well vascularized portion is left projecting beyond the cut end of the intestine is often absolutely impossible to follow, with the thickened infiltrated mesentery met with in many cases. Finally, the end-to-end anastomosis of the small with the large intestine often leaks, despite all precautions taken, because of the portion of colon often found uncovered by peritoneum between the layers of the mesocolon.

CASE III.—*Adeno-carcinoma of the transverse colon and sigmoid.* Death. Mrs. L. T., age 56. Health apparently good until the last few months, when she experienced pain in the left lower abdomen and a physician detected a tumor. Vomiting and nausea immediately set in, attributed to medication, with frequent, painful micturition, some incontinence, and the urine was "deep red," malodorous, a heavy sediment being thrown down. The vesical symptoms lasted only two months, producing much loss of sleep and flesh, but the urinary symptoms had nearly ceased on her admission to the hospital. Omitting details, an irregular, freely movable tumor as large as the fist, was made out in the left inguinal region, which was not attached to the uterus. The proctoscope could be passed up beyond the growth, which could be moved over the anterior surface of the instrument.

November 7, 1904, I delivered through a vertical incision, made by splitting the outer portion of the left rectus muscle, a mass of intestines and omentum adherent to the bladder, from which separation was finally effected without penetration of this viscus. A loop of adherent small intestine was slightly torn during the separation and was at once repaired by celluloidin thread sutures. The tumor was now seen to consist of the splenic flexure of the colon, which had become adherent to the sigmoid, necessitating the removal of several inches of bowel in both localities, as the remains of the sigmoid and transverse colon could not have been brought together if the two diseased areas had been excised with the intervening ascending colon. The union at both points of resection was made end to end by celluloidin thread sutures and proved mechanically competent on the post-mortem eight days later, when the bowel at the upper anas-

tomosis was found gangrenous and perforated. Several free movements of the bowel had been secured before perforation took place.

Unquestionably it would have been much better to have made a right-sided colostomy instead of resecting, but so much damage had been done while determining the exact condition of the parts that resection seemed imperative. If I meet with a similar case I shall resect both diseased areas, make an anastomosis at the site of the lower resection, and establish a temporary colostomy by securing the ends of the bowel resulting from the upper resection in an incision of the abdominal wall. This would probably enable the anastomosis to heal securely, while later the colostomy could be safely closed by a secondary operation.

Another common error is to fail to recognize that malignant disease of the bowel does occur with sufficient frequency in the young to demand careful consideration when the clinical symptoms and signs point in this direction, as is demonstrated by Case IV, where the disease probably commenced during the latter part of the patient's eighteenth year.

CASE IV.—*Carcinoma of cæcum*. Recovery. M. R., aged 20 years, was admitted to my service May 3, 1905, with a history of attacks of sharp pain during the last year located in the umbilical region. He was occasionally nauseated and had vomited some six times in all. The pain on each occasion lasted only two or three hours. He was able to work until three weeks before admission. Constipation existed, but no pronounced obstructive symptoms. Fever was absent.

A tumor to the right of the umbilicus was detected by my assistant, Dr. Darling, who operated at my request and in my presence on May 16, 1905. A vertical incision, splitting the right rectus muscle, was made from above the umbilicus nearly to the pubes. The omentum was adherent to a large mass consisting of small intestine, cæcum and ascending colon, the mass extending well down into the pelvis behind the bladder. After clamping, the caput coli, ascending colon and small intestine to the extent of thirty-five inches was removed, with the correspond-

ing mesentery. A Murphy button reinforced by interrupted silk sutures secured an end-to-end anastomosis. Convalescence was fairly smooth and the patient left the hospital June 14, 1905, with sound healing, but with retention of the button in the sigmoid, it was believed, on the evidence of a skiagraph.

CASE V.—*Massive tuberculosis of large intestine and ileum.* Recovery. E. H., aged 39, entered the University Hospital May 22, 1905, having first noticed occasional abdominal pain late during the summer of 1904, but toward the end of November, 1904, he was attacked by severe pain in the right inguinal region with repeated vomiting. Nothing new was noticed until about Christmas time he had a sharp attack of diarrhœa. On January 21, 1905, his physician detected a small tumor which could not always be made out, according to patient's statement, but on my examination a large somewhat movable mass was detected in the right lower abdomen. May 25, 1905, I delivered by an incision splitting the right rectus muscle a series of nodular, papillary tumors involving the caput coli and small intestine, forming a large adherent mass, with apparently healthy intervening areas of small intestine. The lumen of the colon was almost closed, the bowel walls being enormously thickened by an infiltration which could only be distinguished from schirrus by the microscope; indeed macroscopically, the pathologist thought it was scirrhus. The involved areas were removed with the corresponding mesentery, comprising the caput coli, ascending colon and small intestine, measuring $36\frac{1}{4}$ inches. A Murphy button was employed for an end-to-end anastomosis, reinforced by interrupted celluloidin thread sutures. A fecal fistula formed at the end of about a week but promptly closed, leaving however a tubercular fistulous tract which now discharges so little as only to require an occasional dressing. He passed the button on the 21st day and has recently resumed his work as a stationary engineer.

CASE VI.—*Carcinoma of the caput coli.* Recovery. F. D., age 38 years, entered the University Hospital June 3, 1905. In February, 1905, he frequently had severe pains, as he described it, "in the stomach," commencing shortly after eating; these attacks of pain continued for two weeks, the intensity varying from time to time. This pain prevented him from working, but

after the lapse of some weeks he became so free from discomfort that he resumed work, but in the first week of May, 1905, while working he experienced a sudden pain to the right of and below the umbilicus, which ceased after a day's duration, but he now detected a swelling in the painful region. Another period of freedom from pain obtained until November 28, when severe paroxysms recurred, to be repeated on the next day, and on May 31st. The patient failed to note any increase in the size of the tumor, but it was extremely tender on pressure; there had been neither fever, vomiting nor constipation. On June 7 I opened the abdomen by splitting the right rectus muscle and removed nearly all the ascending colon, the caput coli and a number of inches of the small intestine, the measurement not having been reported to me. End-to-end anastomosis was effected by a Murphy button reinforced by sutures; the button was passed on the tenth day. Convalescence was smooth and the patient was discharged well on the twenty-first day.

CASE VII.—*Carcinoma of the Sigmoid*. Recovery. Mrs. S., age 50, entered the University Hospital February 3, 1905. About one year ago she began to feel weak, but nothing definite was noticed until an attack of severe pain in the right side occurred last spring, followed by a bloody mucous fluid which still continues to be discharged during evacuations of the bowel. Marked constipation developed, and the pain was now constant, extending down the left leg, but this had been absent until one week ago for three months. Examination of the abdomen revealed a tender mass in the left inguinal region unconnected with the uterus; it was irregular in contour and was slightly movable. The mass extended somewhat deeply into the pelvis. On February 20, 1905, I introduced my hand into the abdomen through an incision splitting the outer side of the left rectus, and found an inoperable malignant tumor of the descending colon inextricably fused with the adjacent parts. It was located too high for a colostomy, and it was desirable to avoid the discomfort of such an operation, so it was decided to make a lateral anastomosis between the splenic flexure and sigmoid portion of the colon, which was effected with some difficulty by means of a Murphy button reinforced by interrupted celluloidin thread sutures. Prompt recovery ensued, the button was passed on the

twelfth day and she returned home March 21, with relief of all her symptoms.

CASE VIII.—*Carcinoma of the Sigmoid.* Recovery. M. B., aged 55 years, entered the University Hospital September 14, 1904, having noticed some constipation since the previous spring. Ten days ago he had the last satisfactory movement of the bowels and one slight movement three days later, but some time during the previous Sunday he began to vomit a bitter material rather frequently, but since entering the hospital emesis occurred but once; the abdomen was considerably distended. Dr. Darling in my absence explored by a median incision but was unable to locate the site of obstruction on account of the great distention of the intestine. Accordingly he punctured a loop of the large bowel giving vent to much flatus, the opening then being closed with silk sutures. This procedure permitted access to the obstruction in the upper portion of the sigmoid but not enough for removal of the carcinomatous mass, so a colostomy was done without any effort to make a spur. Convalescence having been thoroughly established, after temporary suturing of the colostomy opening to secure asepsis, an incision to the inner side of the left rectus was made on October 6, 1904, when I resected without any special difficulty the carcinomatous mass, employing a Murphy button to reunite the bowel. At one point the transverse colon was firmly attached to the bladder, probably where the bowel had been punctured at the first operation to get rid of the distention; a small opening resulted, which was closed with celluloidin thread sutures. Convalescence was prompt and satisfactory, the patient leaving the hospital November 9, 1904, with a small fecal fistula alone representing the large colostomy opening; this opening was subsequently (January 28, 1905) cauterized with the Paquelin cautery, after which the opening quickly closed. Owing to carelessness the button was not detected in the stools, but repeated X-ray examinations show that the button has been passed.

This case illustrates several important points, viz., the occasional impossibility of primarily removing the cause of obstruction in the large bowel even when the condition of the patient permits of prolonged manipulation, because of the dis-

tention of the whole intestinal tract; the failure of puncture of the bowel to remove enough of the intestinal contents to be of service, while a colostomy will in time permit one to gain free access to an obstruction which originally seemed inaccessible; and the invincible tendency of an artificial anus to close if no spur is formed as soon as all stricturing of the bowel is removed.

This is the last case which I shall quote, although I could readily add to the list, but I think that single and double resections, side-tracking, temporary drainage of the bowel and permanent intestinal fistulæ, union by suture and by mechanical devices and omental grafts have all been illustrated, and that in principle the whole of the modern surgery of the large intestine has practically been covered by these cases.

In conclusion, let me emphasize a few facts, some of which are well known but which seem to be forgotten by many practitioners, the first being that neoplasms of the large intestine give rise for long periods to little beyond what is called constipation by patients, and attacks of cramping pains with some passing distention, and that this may be all that has been noticed when during operation, or at the post-mortem, the lumen of the bowel seems incapable of transmitting feces. Vomiting is a late or even absent symptom, but may suddenly supervene with all the symptoms of acute obstruction. If the diagnosis was made earlier than it usually is, resection with a real cure would be common, instead of these late and too often useless operations. We are too accustomed to disregard the possibilities of localized massive formations of tubercle with matting together of adjacent structures occasionally simulating malignant neoplasms, as seen in Case V; in a doubtful case tuberculin might settle this question. Again, the desirability of opening the intestine to produce sufficient collapse to enable the operator to deal radically with a stricture in the presence of acute obstruction is questionable unless by this device side-tracking by a lateral anastomosis be rendered possible between a loop above and below the obstruction, otherwise colostomy or enterostomy is the only proper operation; moreover, a bowel incision may lead to dangerous adhesions, for instance to the bladder, as in Case VIII. Too often the

attempt is made to eradicate malignant disease by free resection, when "side-tracking" would be equally efficient and productive of as much palliation as resection, with vastly less risk to life. Too much stress is laid by some upon the removal of the appendix and securing the opening into the bowel in all cases of perforation with pus formation. Although when this cannot be done death often follows, this result is more apt to be due to the precedent conditions, while occasionally a patient can be saved for a successful secondary operation by avoiding all primary radical measures, as in Case I. I can see no difference in the results between suturing and the Murphy button, provided care be taken in both instances to see that the portion of the large bowel uncovered by peritoneum has this membrane carefully drawn over the muscular coat by special sutures when the button is not used, or where this device is employed, by the over-and-over loop of the purse-string drawing both layers of the mesocolon together, as Murphy has so urgently directed, but which essential precaution is frequently neglected by other operators. The button usually takes less time to employ than suturing, although I rarely fail to pass reinforcing sutures, but for lateral anastomosis it is superior to suturing, while it can be successfully employed where sutures are out of court, *i.e.*, when one end or the ends of the bowel are bound down, thus preventing the free handling and ready access to all portions of the line of union so essential for securing suturing.

A METHOD OF PERMANENT DRAINAGE OF BOTH KIDNEYS THROUGH THE LOIN IN CONNECTION WITH BILATERAL NEPHROSTOMY.

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(An addendum to an article by the same writer published in the December number of the *Annals of Surgery*, 1905.)

IN the December number of the *ANNALS OF SURGERY*, there was published an article by me in which I endeavored to establish certain things in connection with a proposal to adopt a new and somewhat radical method for the surgical treatment of tumors of the bladder, the following being the more important of them:

1. That the operative treatment of tumors of the bladder had been hitherto far from encouraging in its results. The results were set forth in the form of an analytical study of a large number of cases reported by different surgeons of various countries, and were arranged with reference to the special kinds of operations that had been applied to the special kinds of tumors.

2. That the reasons for the unusually large proportion of failures which had attended the operative treatment were as follows: (a) The inadequacy of the less radical measures to the ends which they aim to secure, even in the cases of benign tumors. (b) The too-tardy employment of operative measures. (c) The failure and dangers of ureteral implantation.

The assertions were supported by data consisting of a large number of cases.

The following conclusions were expressed as those derived from the study of the subject:

1. That ureteral implantation should be abandoned as a means for diverting the urine in connection with total extirpation or resection of the bladder in cases of vesical or prostatic

tumors, and that permanent renal fistula established by lumbar nephrostomy (unilateral in case of resection of the bladder necessitating the division of one ureter; bilateral, when both are involved), be substituted for it, and that the renal operations shall be done as a preliminary step to the operations upon the bladder, the latter being performed at whatever time subsequent to the nephrostomy the patient's condition should have become good enough to have them undertaken.

In doing the nephrostomies, the ureters should be tied off as near as possible to the pelves of the kidneys.

2. That total extirpation of the bladder should be performed at as early a period as possible after nephrostomy had been done in all cases of malignant tumors of the organ in which the disease had not exceeded the limits of the bladder or prostate and seminal vesicles, and in which there was believed to be no metastasis present. This should be performed at the outset,—that is to say, it should not be preceded by some less radical measure in that class of cases, and the same should be done in all cases of benign vesical tumors which have occurred more than once.

The writer proposed to have this plan applied only to patients in good circumstances who could care for the renal fistulæ properly.

The dangers of nephrostomy *per se* were stated to be exceedingly small, and this assertion was supported by the results of a large number of cases in which the operation has been done.

The inconveniences and distress attending renal fistula the writer believed could be avoided if a proper provision was made for draining the kidneys through the loin. He cited one of his cases as an example of the successful employment of a simple and practical manner of arranging such apparatus, which was that of a man upon whom he had performed nephrostomy and established a permanent renal fistula on one side eleven years ago and who had had the same procedure carried out upon the second kidney by his colleague, Dr. Thorndike, upon the other kidney four years ago. This patient had worn the apparatus and passed all the urine for eleven years through the loin on one side, and during the last four years through the loin of both sides and from both kidneys. Not only had the operations in each instance saved the patient's life, but he

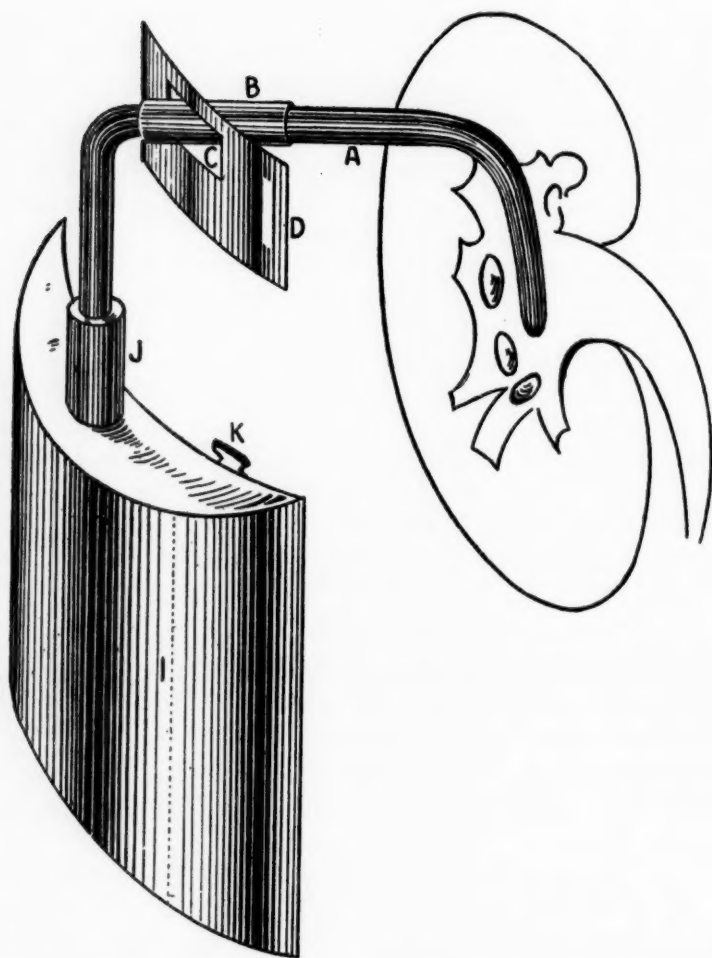


FIG. 1.—*a*, drainage catheter; *b*, rubber tubing which fits into orifice of fistula and is held by horizontal opening in shield *c*; *i*, flask to receive urine; *j*, nozzle of flask into which outer end of catheter is passed; *k*, ring used to attach flask to hook on waistband (fig. 3-*k*).

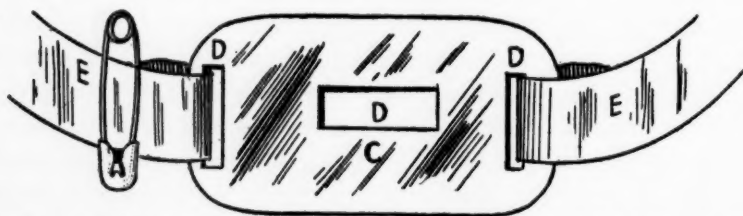


FIG. 2.—Shield with tape attached to the holes at its ends.—*c*, Shield; *d'-d''*, openings for tape; *e-e*, ends of tape band which attaches the shield to the patient's back.

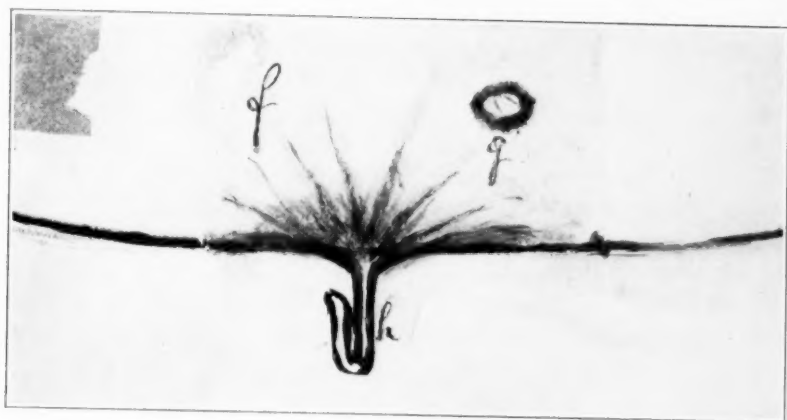


FIG. 3.—A bit of the waistband showing one of the hooks to which the reservoirs are attached and the hole through which one of the catheters is passed; *f*, waistband; *g*, hole for catheter; *h*, hook.

had been restored by them to entire health and to-day both kidneys are secreting approximately a normal amount of nearly normal urine. The patient is entirely comfortable; he is pursuing an active business life; not a drop of urine leaks around the drainage tube and consequently there is no odor and he is entirely dry. No one is aware of his condition. In short the patient's history subsequent to the operation shows that it is perfectly possible to so arrange drainage from permanent renal fistulæ as to secure for the patient health, comfort, active life and entire freedom from distressing conditions of any sort.

The apparatus by which this result has in this case been accomplished was not described in the writer's article published in the December *ANNALS*. A number of inquiries with regard to it have convinced him that it would be worth while to present it, with which intention the following description is given, with illustrations on opposite page.

The following articles compose the apparatus for draining the kidney. (In the illustrations, one of each of the different parts of the drainage apparatus only is designated, and is intended to serve as the example of all similar parts of it when these are duplicated for the double-sided drainage.)

1. Two red rubber drainage catheters. (Fig. 1a.)
2. Two bits of rubber drainage tube each two and a half inches long (more or less, according to the thickness of the patient's back), and of a size to fit tightly upon the catheters and in the horizontal opening of the shield through which they are passed. (Fig. 1b.)
3. Two hard rubber shields (Figs. 1 and 2c) about three inches in length, two inches wide, and curved to fit the back. There are three openings in each of the shields (*d*, *d'*, *d''*, Fig 2), two perpendicular and one horizontal; the latter should be a little narrower than the rubber tubing *b* in order that it may compress the tubing firmly enough to prevent it, and the catheter which passes through it, from slipping to or fro. The former are long enough to admit tapes an inch wide.
4. Two pieces of strong tape or elastic webbing. (Fig. 2e.) One end of this tape is attached to the outer of the two perpen-

dicular openings in the plate. The tape should be long enough to pass around the body and is secured in the opening at the further end of the shield by safety pin or other device as may be preferred. Elastic bands have the advantage, as compared with tapes, of adapting themselves to the movements of the body and thus keeping the shield constantly apposed to the back.

5. A waist band (Fig. 3*f*) long enough to go around the body and about four inches wide. This band should be of stout material; its front ends are brought together by a couple of straps and buckles; on the lower border of the back of the waist-band are attached four stout hooks, and there are two holes to allow the catheters to be led through the band. (Fig. 3*g* and *h* represent the part of the band showing the hook and one hole.)

6. Two flasks, five inches long by four inches high by one and one half inches wide, curved to fit the gluteal regions; each having a nozzle projecting one inch above the middle of its top and just large enough to admit the ends of the catheters, and provided with a ring firmly soldered near either end of the inner side of the tops of the flasks. (Flasks, Fig. 1*i*; nozzle *j*; rings *k*.)

The flasks may be made of hard rubber, aluminum or any other suitable material having a surface that will not absorb the urine.

Precautions to be observed in applying the apparatus.—Before placing the apparatus upon the patient the points within the kidneys from which the ends of the drainage catheters will best drain the organs should be determined, and the catheters marked at the point at which they emerge from the mouths of the fistulæ; this mark will serve as a guide to show how far the instruments should be passed in and also where to place the bits of rubber tubing upon them. The marks on the catheters should correspond to the middle of each bit of tubing.

One other precaution must be observed with respect to the places of the ends of the catheters in the kidneys, viz., *they must not cause pain to the patient.* This will be produced if the ends rest in the pelvis too near to outlet, and in my patient I have known a faulty position of the tubes call forth, though in a moderate degree only, the characteristic pain of renal colic.



FIG. 4. - Urine receptacles adjusted to receive secretion from Kidneys.

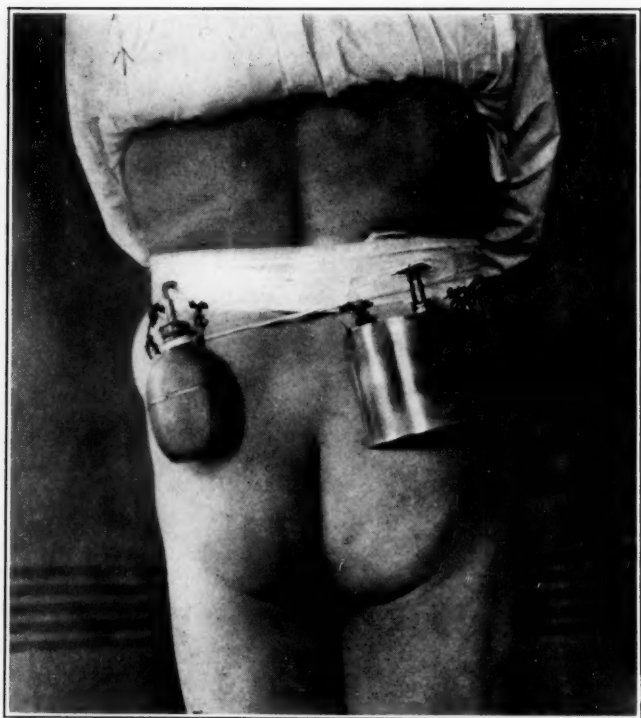


FIG. 5.—Urine receptacles adjusted to receive secretion from Kidneys; retention girdle applied.

In what follows with regard to the manner of applying the apparatus, it is referred to as though but one side was to be drained, in order to make the description simpler and more readily understood.

Enter the catheter, with its bit of rubber tubing properly placed upon it, into the fistula until one-half of the tubing lies within the mouth of the tract.

Put the outer end of the catheter through the central opening in the shield and push the latter along the catheter and bit of tubing until it lies against the surface of the back. Then pass the free end of the tape (or elastic band) belonging to the shield around the waist and through the perpendicular opening in the other end of the shield and attach it securely there.

The catheter is thus securely fixed in place so that it cannot be moved either inward or outward, as is shown on the right side of the back in Fig. 4.

Attach the waist band to the patient, passing the catheter through the opening in the back of it made for that purpose.

Fasten the reservoir (flask) upon the waist band by passing the hooks upon the latter through the rings upon the upper edge of the former, and insert the end of the catheter into the nozzle of the flask (Fig. 5).

When it is necessary to empty the flask, the patient can readily detach it himself.

Every night the catheter which has been worn through the day is replaced by another, which should be boiled for fifteen minutes previous to its being used. The night catheter is replaced in the same way by the other in the morning. When this is done, the kidney and the fistula should be irrigated gently with warm sterile saline solution, permanganate of potash (one part to 5000 of water) or other bland cleansing fluid that the surgeon may prefer. The flasks should be boiled once every twenty-four hours, and thoroughly washed out at least once besides in each day.

This is the form of apparatus which has been employed by me in the case of the patient referred to earlier in the communication, and with which he has been perfectly satisfied and comfortable. It requires care and attention to keep it clean,

and must be placed upon the patient properly if it is to answer its purpose. In considering the trouble that there is in taking care of such an arrangement it should be remembered that the conditions under which it would be employed are, or rather have been, desperate and if, after life has been saved by operative intervention, an apparatus can be devised whereby the patient is rendered entirely comfortable, as was the case in this instance, the matter of its being more or less troublesome to apply and to keep in proper condition is of very little importance in view of the benefits that have been obtained and the comfort and good health of the patient that have been secured.

The means by which the kidneys were drained in this case is only one of a number by which the same end might be attained, nor is it, in the writer's judgment, the most convenient form of apparatus that could be used for accomplishing it, but having had practical experience with this one, it has seemed better to describe it.

CONTRIBUTION TO THE SURGERY OF THE KIDNEY.¹

CASES REQUIRING NEPHRECTOMY.

BY GILBERT BARLING, M.B., F.R.C.S.,

OF BIRMINGHAM, ENG.,

Professor of Surgery in the University of Birmingham; Surgeon to the
Birmingham General Hospital.

CASE I.—*Renal Mobility with Tumour (Hypernephroma) causing Pyloric Obstruction; Nephrectomy, with relief of symptoms.* A lady, aged 50, consulted me on March 1, 1905, for pain in the right side of the abdomen and extreme constipation. For four years she had been a complete invalid, unable to do any work, even such as the supervision of her house involved, and during the last few months of that time she had practically been confined to bed and only able to take fluid diet and semi-solids. Even with this extreme care in dieting she occasionally vomited, and the consumption of solid food practically always gave rise to vomiting. Rest in bed made the patient feel more comfortable, but even then indigestion was very troublesome and she had lost weight to an extreme degree.

On examination it was found that the stomach was dilated and proptosed; the lower border on distension reached nearly three inches below the umbilicus; no peristalsis could be observed or elicited. There was a rounded mass in the right loin, which appeared to be continuous with the lower end of the right kidney, from which it could not be separated, the kidney was almost entirely below the costal arch, was freely movable and could be pushed bodily upward with the tumour, but it could not be completely replaced in the loin.

It seemed doubtful whether the patient was the subject of an actual stenosis of the pylorus, or whether the displaced kidney and the tumour attached to it interfered mechanically with the pylorus and duodenum by dragging on these structures. To

¹ Read at the meeting of the Midland Medical Society, December 6, 1905.

enable one to deal with any condition present it was decided to open the abdomen anteriorly rather than to attack the renal tumour from the loin.

Operation by incision through the right rectus. The pylorus was not stenosed, as the index-finger could be invaginated through it. The peritoneum was therefore divided over the right kidney to the outer side of the colon, and it was then found that there was a rounded elastic mass about the size of an orange connected with and partly enveloping the lower end of the kidney. (Fig. 1.) The nature of the tumour was doubtful, and as it might prove to be malignant it seemed better on the whole to remove the kidney and tumour together rather than to do resection of the kidney. Palpation of the left kidney showed that it was a healthy and well-formed organ, and nephrectomy was therefore performed. The tumour was found to be closely associated with the second part of the duodenum; so closely, in fact, that the outer coats of the intestine were injured and required suturing.

A good recovery followed the operation and within three weeks the patient was able to take solid food, meat and vegetables, in carefully administered quantities.

I have not seen her since she left the Nursing Home, but on inquiry by letter learn that she is immensely benefitted, though she still gets indigestion and flatulence; she has gained weight and is able to get about and do a certain amount of work, and she speaks of "her wonderful health in comparison with that of the last few years."

The inability of the stomach to discharge its functions and the resulting wasting may have been brought about either reflexly by the weight of the kidney and tumour dragging on the renal plexus, especially in the vertical position, or by kinking of the duodenum from the sagging downward of the tumour, which was closely attached to the second portion of the bowel. On the whole I am inclined to regard the second explanation as the correct one.

The association of renal mobility with dilatation of the stomach is not rare, and the question often arises, are these two displacements simply the results of a common factor, or



FIG. 1.—Showing the kidney unopened with the tumor at the lower end.



FIG. 2.—Showing a section of the kidney and growth.

does the first stand in causal relation to the second? The symptoms present are often those of neurasthenia, with vague pains and discomforts and stomach indigestion. Are the symptoms due to the descent of the kidney, or is the stomach to bear the onus of them? The answer is often difficult, but the case just related appears to shew that the drag of an unusually heavy kidney may be sufficient to interfere mechanically with the emptying of the stomach.

The removed specimen is in the Museum at the University, and I have to thank Dr. Hewetson, curator of the surgical portion, for the following account of the pathology of the tumour and for the photographs which illustrate it.

REPORT.—The tumour is situated within the capsule of the kidney and occupies the lower half of the entire organ. (Fig. 2.) It is roughly pear-shaped, the apex being uppermost, and has the following dimensions: Length (vertical) 8 cm., breadth (lateral) $5\frac{1}{2}$ cm., thickness (antero-posterior) 6 cm. The growth is definitely circumscribed by a dense fibrous capsule which separates it clearly from the kidney tissue above. The tumour substance resembles in appearance that of a deciduoma malignum, and consisted when fresh of a maroon-coloured spongy tissue with small areas of a firmer pinkish medullary tissue.

There are no visible trabeculae passing from the capsule into the interior of the growth, and it can be stripped away from the capsule without much difficulty.

The naked eye appearances are those of a localised tumour beginning in the kidney tissue and presenting extensive areas of necrosis, or of old blood extravasation. The kidney tissue above the tumour, measuring about $8\frac{1}{2}$ cm. in length, is to all appearances healthy. The capsule of the kidney can be readily stripped from the renal parenchyma, but is very adherent to the tumour.

The ureter is normal, the renal pelvis is slightly dilated. The renal vessels exhibit no special peculiarity.

Microscopical Characters.—A section was taken opposite the upper part of the tumour, involving an area equal to about one-third its diameter. Externally there is a dense capsule consisting of concentric layers of fibro-muscular tissue; within this are layers of fibrous tissue in whose meshes are flattened kidney

tubules representing the kidney tissues which had become flattened and attenuated by the slow expansion of the tumour. Within this again is a further concentrically-arranged fibrous layer representing probably the capsule proper of the tumour. From this layer very delicate septa pass into the soft substance which comprises the new growth. This consists mainly of masses of old blood-clot shewing red corpuscles, white corpuscles and granular debris. The pinkish islets of tissue previously mentioned indicate the real nature of the growth, and this consists of epithelial cells cubical or polyhedral in shape arranged as delicate papillomata. (Fig. 3.) Each papilloma consists of a thin stem of areola-fibrous tissue covered by a single layer of cubical or polyhedral cells containing clear transparent protoplasm and a well-stained nucleus situated about the middle of the cell. (Fig. 4.) The delicate papillomata are arranged in a complex dichotomous manner. The tumour is very vascular, being supplied with large thin walled sinuses within the substance of the tumour and by large thick walled vessels within the meshes of its fibrous capsule. There is evidence of extensive extravasation, which cutting off the blood supply from large areas of papillomata, these have become degenerate and necrotic. There is no evidence of cyst formations within the tumour.

It would appear that this type of tumour, though moderately well known to pathologists, is little if at all known to surgeons. It has previously been regarded as adenoma, lipoma, angioma, endothelioma and carcinoma of the kidney. In 1883 Grawitz asserted that this type of growth was developed from misplaced portions of suprarenal tissue, and not from uriniferous tubules or the endothelium of lymphatics.

This view of Grawitz is generally accepted now and the tumour has been called by such names as Hypernephroma and Struma suprarenalis.

A critical review of this type of growth was given by A. O. J. Kelly (*Phil. Med. Jour.*, July 30 and Aug. 6, 1898); they are always soft and marrow-like and invariably definitely encapsuled. Occasionally they grow to a considerable size. They rarely produce hæmaturia; they are prone to interstitial hæmorrhages; they occasionally shew malignant characters,

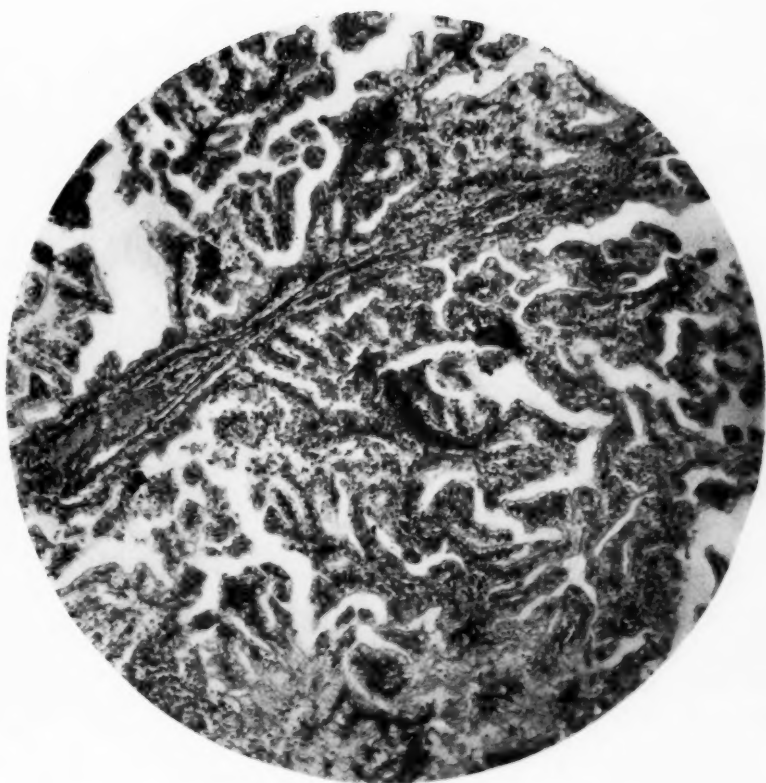


FIG. 3.—Showing the complex dichotomous branching of the papillomata.

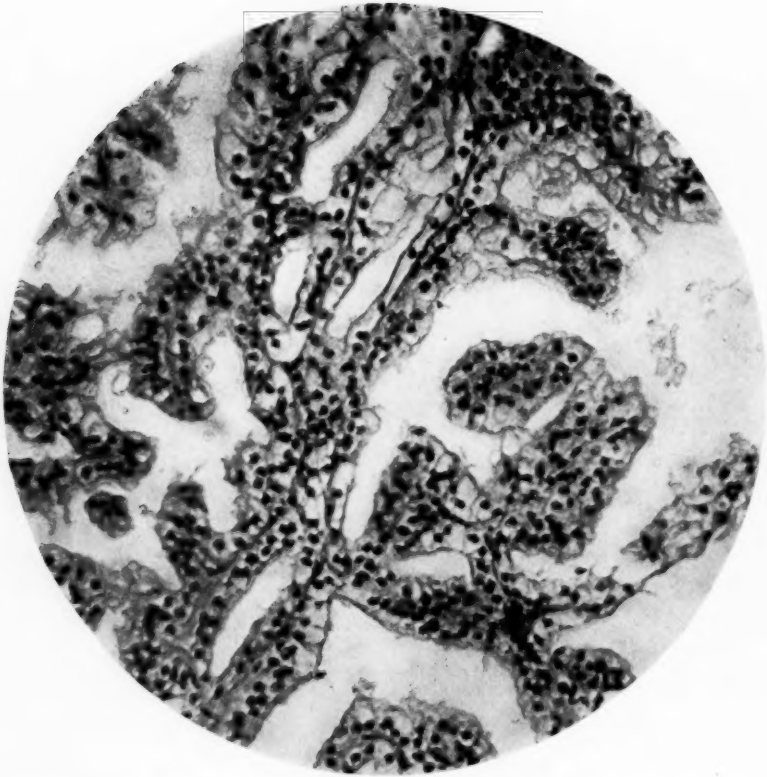


FIG. 4.—Showing the character of the epithelium covering the slender papillary growths.

giving rise to metastases in lung, liver and bones. Nearly all the reported cases have occurred in men and women between 40 and 50.

The next case is also one of great interest both from the clinical and the pathological standpoint.

CASE II.—*Pyelo-nephritis and Ureteritis of uncertain nature. Nephrectomy. Recovery.* A male, aged 26, was admitted to the General Hospital in May, 1905, for pain in the left loin and down the course of the ureter. For some twelve years the patient had suffered discomfort in the penis after micturition, the urine being generally turbid. Six years ago this inconvenience became worse, pain in the back was complained of, the urine became more turbid and a deposit of mucus was noticed in the chamber. Still later pain was complained of in the upper part of the thigh. All these symptoms were present at the time of admission, but were none of them very acute, though from time to time they caused the patient to rest from work for a day or two. No enlargement at the kidney could be felt, but there was tenderness over the organ. Examination of the urine shewed a small quantity of pus but no blood crystals or tubercle bacilli. Cystoscopic investigation failed to shew any condition in the bladder which might explain the symptoms; the left ureteral orifice did not appear to differ from the right.

The patient was again admitted to hospital in September, 1905, with all his symptoms worse, willing now to submit to operation, as his disablement was increasing and he had not been able to work at all for some weeks. The urine at this time was acid, it contained pus, but blood crystals and tubercle bacilli were still absent.

Operation.—The left kidney was exposed by the usual oblique lumbar incision; its pelvis was found to be dilated and much thickened but no calculus could be discovered. The ureter was then examined and found to be densely thickened and enlarged nearly to the size of the little finger at its upper part, gradually diminishing in size toward the bladder, though it was still unhealthy to within an inch of the organ. The diagnosis appeared still to be tubercular disease. The peritoneum was opened at the bottom of the wound and the hand passed across determined

the presence of the right kidney, which appeared to be free from any gross change. Nephrectomy and complete ureterectomy was therefore performed, as any less procedure did not promise to restore the patient to active work as a coach finisher. An easy recovery followed the operation and the patient is now well.

The method of examining the opposite kidney before proceeding to nephrectomy is one which is no doubt often resorted to by other surgeons, but it appears worth while calling attention to it, as it may not be generally practised. Complete ureterectomy was effected simply by enlarging downward and forward the lumbar incision, a method by which I have been able also to remove a calculus impacted in the ureter close to the bladder without making a second incision in the iliac region. In my experience there is scarcely any limit to what may be done in the way of removal of huge enlargements of the kidney and the ureter through this prolonged lumbar incision. If need be there is ample evidence in some of the cases I relate here of the wisdom of keeping kidney operations retroperitoneal rather than intraperitoneal whenever this can be done.

Pathological note and photographs of the specimen by Dr. Hewetson.—The capsule of the kidney is thickened but strips without much difficulty, the kidney pelvis is dilated and its walls thickened and indurated. The ureter has the calibre of a cedar pencil and possesses thickened walls. On section it is readily seen that the chief seat of the trouble lies in the pelvis and ureter; both are lined by a whitish granular layer, which largely accounts for the thickening and induration of their walls. No calculus can be discovered. The kidney tissue is of a pale pink colour and cuts very much like that of a lardaceous kidney, although there is no characteristic stain if iodine is applied. The cortex is not altered in size; the medulla is somewhat congested. There are no abscesses visible to the naked eye within the kidney tissue. At one or two points the granulation tissue lining the smaller divisions of the kidney pelvis appear to have burst into the medulla of the kidney and formed very small abscesses there. At the upper pole of the kidney there are one or two shrunken areas of kidney tissue shewing a brownish red colour on the sur-

face; these are probably either of a thrombotic or infarctic nature. The blood-vessels of the kidney are normal.

Microscopical.—The kidney tissue everywhere shews advanced parenchymatous nephritis, with destruction of glomeruli and kidney tubules over extensive areas. This destruction is due no doubt to the infiltration of the interstitial tissue with small round cells which are diffusely arranged in both cortex and medulla. This inflammatory reaction is widespread and not arranged in tubercle formations.

The kidney pelvis and ureter are enormously thickened, this being due almost entirely to an inflammatory change in the mucous and sub-mucous coat. This consists of the breaking up of a thick layer of round cells chiefly of a mononuclear variety, which either lie in the sub-epithelial layer or entirely replace the epithelial cells. There are no giant cells anywhere and no suggestion of tubercle formations.

The nature of the pathological process is probably that of a sub-acute inflammation arising in the pelvis or ureter of the kidney and which has gradually spread to the kidney tissue. From the histological character of the sections of kidney tissue, pelvis and ureter, one would infer that this is probably an inflammatory process of a simple pyogenic nature and not of a tuberculous one, although no cause such as calculus was found to originate the condition.

CASE III.—*Intermittent Hydro-nephrosis with extreme mobility of the kidney. Nephrectomy.* Recovery. This specimen was removed from a lady, 35 years of age, who had since early childhood suffered from attacks of pain in the right side of the abdomen and the right loin, pain which at times was very severe and caused vomiting and which for some years had been associated with a swelling in the right anterior renal region, the swelling from time to time subsiding with an increased excretion of urine which occasionally would be coffee-coloured, suggesting that there was blood in it. When I first saw the patient she had a swelling as large as a child's head, entirely below the costal arch on the right side and reaching back into the loin; it was fluctuating and freely movable, both vertically and laterally.

Operation by the usual oblique lumbar incision. After pal-

pating the left kidney in the manner I have already described and finding it plump and healthy and not unduly movable, the right kidney was removed, as it was found that the kidney tissue was reduced to a mere shell; there was hardly anything but the capsule left. The attachment of the ureter to the kidney pelvis was such that an incomplete emptying of the pelvis must have been habitual. It is of course in this case impossible to say whether the mobility was the first fault which so kinked the pelvis and ureter as to cause distension of the organ, or whether some congenital fault in the attachment of the ureter to the kidney pelvis was the first cause of the hydronephrosis and the intermittent emptying of the organ produced displacement of structures around and secondary mobility. I incline to think that the mobility of the kidney was the first step in the destructive processes that had gone on. Certainly this is so in some cases, of which the following is an example:

A year ago a lady, aged 45, was sent to me by Dr. Roberts, of Dursley, with a history extending over thirteen years, of pain in the right side of the abdomen which came on after an acute illness. Ever since that illness from time to time there had been pain in the right side of the abdomen and the right loin; the pain was made worse by exertion, and it was also especially bad when the patient was tired; occasionally vomiting was associated with the pain. At times micturition was very frequent, and at others the patient was unable to pass urine without great difficulty. On examination the right kidney was found freely movable either in the recumbent, lateral or vertical positions; the left kidney could not be felt.

I performed nephropexy by the method I generally adopt, a modification of Goelet's, and found a considerable degree of hydronephrosis, so that nearly half the kidney tissue was destroyed; there was an abnormal renal artery at the lower pole of the kidney.

During the first few days after the operation there was great discomfort and dysuria. These symptoms were so severe that it appeared doubtful whether nephrectomy would not be required, but the acuteness of the symptoms gradually subsided, and when the patient got up at the end of four weeks she was perfectly comfortable and has remained so ever since.

A year after her operation she reported herself as feeling strong and well, and able to walk four or five miles without difficulty. She and her husband stated that the improvement in her health since the operation was marvellous; that she was now able to undertake duties which before were quite impossible for her; that her life was not only more comfortable but that mentally she was quite different, bright and happy, instead of being depressed and morbid.

I mention this case to shew that mobility may be an efficient cause of hydronephrosis and that fixation of the movable organ may suffice to prevent further deterioration of the kidney and at the same time give relief to the distressing symptoms.

The earlier part of this year I was consulted concerning the wife of a medical man who was very seriously ill from a right-sided pyonephrosis, associated with mobility of the right kidney. It appeared to me from the history in this case that there was some hydronephrosis due to movement and that infection invaded the distended organ, setting up an acute pyonephrosis. Happily the purulent collection eventually discharged itself down the ureter and the urine became almost, but not quite, free from pus after prolonged rest and treatment. Further examination of this patient shewed that both kidneys descend freely when she is in the upright position, and a past history of many years of indifferent health, weakness, exhaustion, and inability for a really active life points strongly to the mobility of her kidneys as the cause of her incapacity. Some three months ago I ordered her a double truss support to keep the displaced organs in position, and she is one of the fortunate patients who has derived very great benefit from this measure for she writes me, within the last few days, that her life is quite different since she has had the benefit of the instrument, and that she is now able to undertake duties that were before quite impossible for her.

I mention this case in conjunction with the preceding ones to point out one of the dangers to which patients with hydronephrosis are exposed, viz., to infection of the dilated

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I mention this case in conjunction with the preceding ones to point out one of the dangers to which patients with hydronephrosis are exposed, viz., to infection of the dilated

tract and resulting pyonephrosis, and I will illustrate this by referring to two other cases which possibly arose in this way.

The two cases next reported are both examples of unilateral pyonephrosis, which appear to have arisen without the provocation of *calculus or tubercle*. Case IV. was probably due to some congenital defect or displacement, for in this instance there is a long-continued history, beginning in young childhood, of attacks of pain in the left renal region associated at times with vomiting. In all probability hydronephrosis was set up which eventually became infected, pyonephrosis resulting. When the patient came under observation he was most gravely ill and the diagnosis, between an acute thoracic and acute abdominal condition, was very difficult. At this time he was far too ill to permit of any operative interference whatever the diagnosis might be, and it was hoped that by withholding operative interference he might struggle through to a more favourable period. This fortunately happened and it became clear that the condition was located in and around the kidney.

In Case V. there was a marked contrast to the very acute and severe illness of the case just mentioned.

This patient was in comparative health and the renal swelling was discovered almost accidentally when he was still following his occupation and apparently without much inconvenience. Neither in the history nor in the removed specimen is it possible to trace the provocative conditions which set up pyonephrosis, but I suspect that in many of these unexplained cases there is in the first instance hydronephrosis either from mobility or from some malformation about the ureter or kidney pelvis.

CASE IV.—*Huge Pyonephrosis and Pyonephritic suppuration with acute symptoms, partly abdominal, partly thoracic. Lumbar Nephrectomy.* Recovery. A male, aged 25, was admitted to the General Hospital under the care of Dr. Simon, September 7, 1905, complaining of severe pain in the left side of the chest and abdomen.

On the day of admission the patient had an attack of acute pain in the left side affecting the back, extending round to the

front of the abdomen and involving the lower part of the left chest where there was severe stabbing pain, worst on deep respiratory effort. When I first saw him the patient was extremely ill; pulse 140; temperature 102; respirations 44. The belly was rigid, the thoracic movements were slight and mainly of the upper part. The diagnosis was uncertain whether acute abdominal lesion or pneumonia with latent physical signs. The history that ever since five years old the patient had suffered acute attacks of pain in the left loin suggested that a plugged kidney with distension and infection spreading from it was the probable cause of the present illness. The delay of a few days materially cleared up the diagnosis; a few blood cells were found in the urine on two occasions; the pain and tenderness became more definitely localised over the left kidney; a large mass could be felt occupying the left lumbar region; the pulse fell to between 80 and 90; the temperature also falling somewhat and becoming of the hectic type.

Operation.—Lumbar incision liberated a perinephritic abscess of some ounces and the kidney was found hugely dilated and extending up to the left arch of the diaphragm above and to the crest of the ilium below. It was shelled out without much difficulty, the vessels and ureter were ligatured separately. A bougie was passed down the ureter into the bladder and the tube was found patent. A good recovery followed.

Examination of the specimen shewed that the whole of the renal tissues were practically destroyed, the distended parts being filled with pus, and there was no evidence of calculus or tubercle to explain the condition found.

CASE V.—*Large Pyonephrosis simulating a Hepatic Tumour. Nephrectomy by abdominal incision.* Recovery. A male, aged 35, was admitted to the General Hospital on September 11, 1905, with a large abdominal tumour reaching from the right costal margin to the iliac fossa and extending laterally from the right side of the abdomen to some inches beyond the middle line. The swelling was very slightly tender, doubtfully fluctuating; it was mobile laterally, and descended somewhat on inspiration. There was stomach resonance over the inner and upper part of the swelling, colon resonance over the front of it could not be made out distinctly, and on palpation the hand could not separate

the upper margin of the swelling from the liver. Bimanual palpation shewed that the swelling did not occupy the lumbar space as fully as was to be expected from renal enlargement. There was no history of any recent inconvenience from the swelling, but the patient stated that he had suffered pain in the right loin three years previously and that his urine was turbid then. Examination of the urine shewed a very few pus cells and the excretion of urea was something under 300 grains.

Operation.—Although there were some points suggesting that the tumour was renal, in view of the uncertainty of the diagnosis an incision was made over the front of the abdomen, when it was found that the tumour was free from the liver and that it was connected with the right kidney. Part of the swelling was fluctuating, but a great deal of it appeared to be solid. The peritoneum over the swelling was opened to the outer side of the colon, the colon and duodenum were stripped off the front and inner side and pushed toward and beyond the middle line. During this manipulation a small collection of pus was liberated. As the stripping proceeded it was found that the innermost part of the swelling was closely adherent to the inferior vena cava, which was separated with great difficulty but without a catastrophe. The renal vessels were ligatured separately, the parts were restored to their natural position and the cavity left was drained by lumbar puncture and the anterior wound entirely closed. Some large lumbar glands were removed, there being suspicion that the condition was really one of pyonephrosis with malignant growth.

The report on the specimen by the pathologist, Dr. Sawyer, shewed that the condition was one merely of pyonephrosis with great thickening in parts of the capsule of the kidney, and the lymphatic glands were also shewn to be free from growth. There was no evident cause such as calculus or tubercle for the condition found.

CASE VI.—*Pyonephrosis with large perinephritic suppuration due to renal calculus. Nephrectomy.* Recovery. A male, aged 58, was admitted to the General Hospital on October 7 with a large abdominal tumour on the left side which had been discovered recently, the man seeking advice because of a feeling of stiffness on the left side which caused him some inconvenience

when at work. The left side of the abdomen was occupied by an elastic swelling, which extended from beneath the costal arch down into the iliac fossa; it reached to the middle line and filled the left lumbar space. The swelling was not tender and was doubtfully fluctuating. The time at which this swelling developed was quite uncertain, for the patient practically knew nothing of it, but he stated that twelve months before he came under observation he had suffered severe pain on the left side of the belly when he was in bed one morning and was sick for about twelve hours then. Since that time he has had what he calls a feeling of bubbling in the left renal region pretty often. The patient states that he has noticed his urine thick and cloudy for the last forty years, and he thinks that at one time he passed blood in it after cycling; he also noticed that he passed urine rather frequently during the day but not so frequently when at rest. He was a well-nourished and muscular man, but his surface arteries were much thickened and tortuous. The examination of the urine shewed constantly the presence of pus and there was a good excretion of urea, amounting to about 300 grains, on a light diet. The diagnosis appeared to be pyonephrosis, probably from plugging by a stone, and nephrectomy was advised.

Operation, October 16, by a prolonged oblique lumbar incision, which opened a perinephritic suppuration estimated at about two pints, the pus being of a peculiar mucus sticky feel but without odor. The kidney was then defined and after much trouble a line of cleavage was obtained, but in the process of stripping the organ the peritoneum was widely opened and it was with much difficulty that the descending colon could be separated from the front of the kidney; indeed it was feared that some of its vessels had been disturbed, but subsequent events shewed that this was not so. It was impossible to suture the opening in the peritoneum so the wound was partly sutured and partly packed with gauze; this latter precaution was especially taken in view of the possibility of necrosis of part of the colon wall from the disturbance it had suffered. Happily the wound healed without any trouble whatever, the bowel remained sound, and the patient was discharged on November 10.

The kidney was widely dilated and practically no renal tissue was left; the dilatation was found to be due to a calculus in the pelvis.

A NEW METHOD OF EXCISION OF THE KNEE WITHOUT OPENING THE JOINT.¹

BY CARLETON P. FLINT, M.D.,
OF NEW YORK,

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Hospital, Out-Patient Department; Instructor in Surgery at the College of
Physicians and Surgeons of New York City.

From the Surgical Department of the College of Physicians and Surgeons
of Columbia University.

Excision of the knee for tuberculous disease is an operation associated with numerous disadvantages.

Tuberculous material is smeared more or less over the wound; often an unavoidable occurrence, which becomes especially dangerous should there already exist some secondary infection at the time of operation. The danger of tuberculous infection of the wound needs but to be mentioned; neither is it necessary to emphasize what the effects of secondary infection might be.

The diseased synovial membrane and other joint structures are frequently extremely vascular, so that the act of excising these tissues is sometimes combined with annoying hemorrhage. The perpetual clamping of small bleeding points prolongs an operation which even under the most favorable circumstances demands considerable time. One does not like to use a tourniquet for any length of time, because of the effect on the nerve supply of the leg and the related subsequent oozing, often very annoying.

This time element is quite important in cachectic and feeble patients.

Any method of resection which depends in part for its success upon complete removal of all diseased tissue after opening the joint is occasionally going to fail because some small

¹ Read before the New York Academy of Medicine, Surgical Section, December 1, 1905.

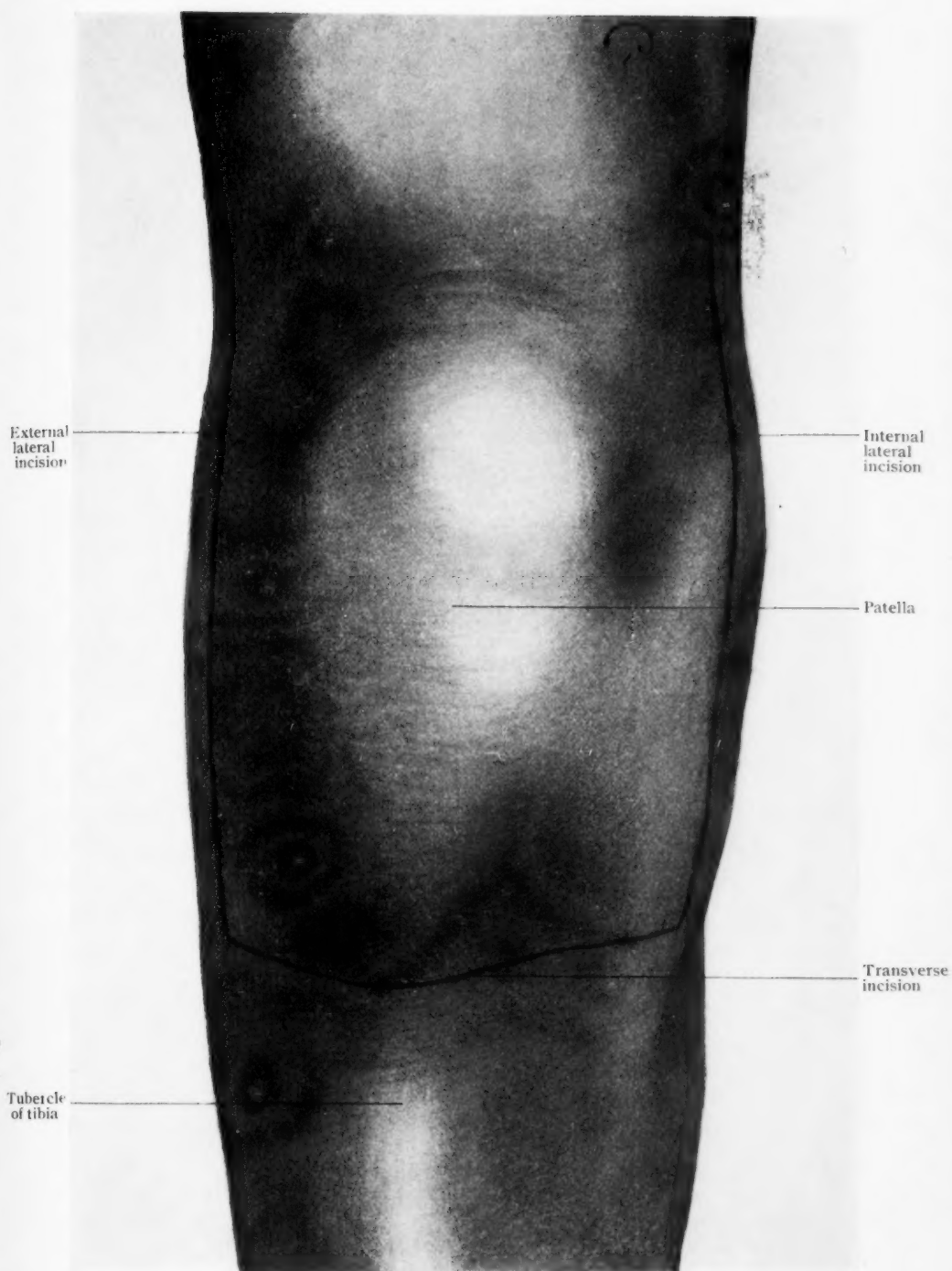


FIG. 1.—Showing square skin incision.

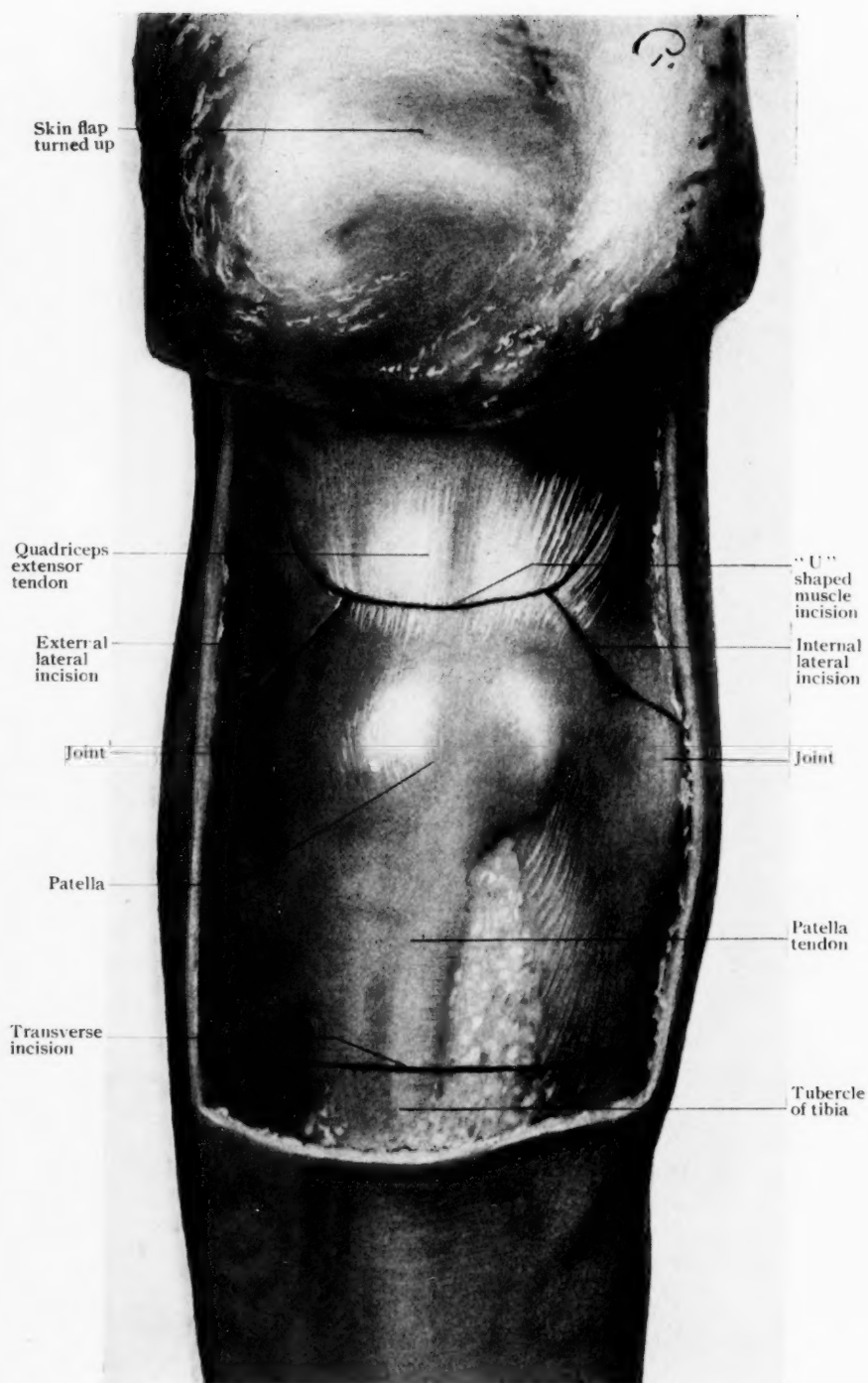


FIG. 2.—"U" shaped incision in quadriceps extensor. Internal and external lateral incisions in fascial expansions of quadriceps. Transverse incision over head of tibia.

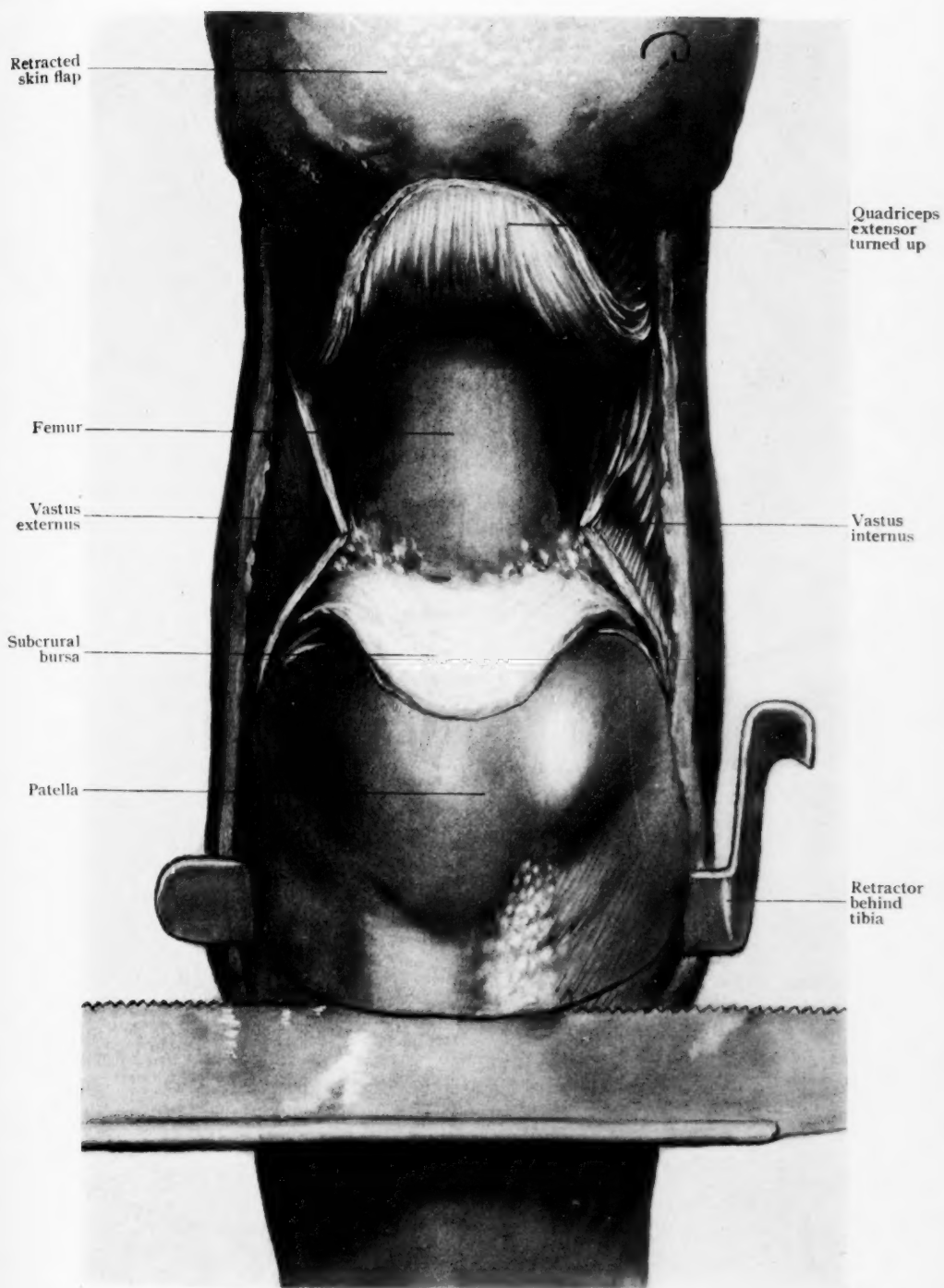


FIG. 3.—Muscle incisions, Bursa turned down. Retractor in place. Saw cutting tibia.

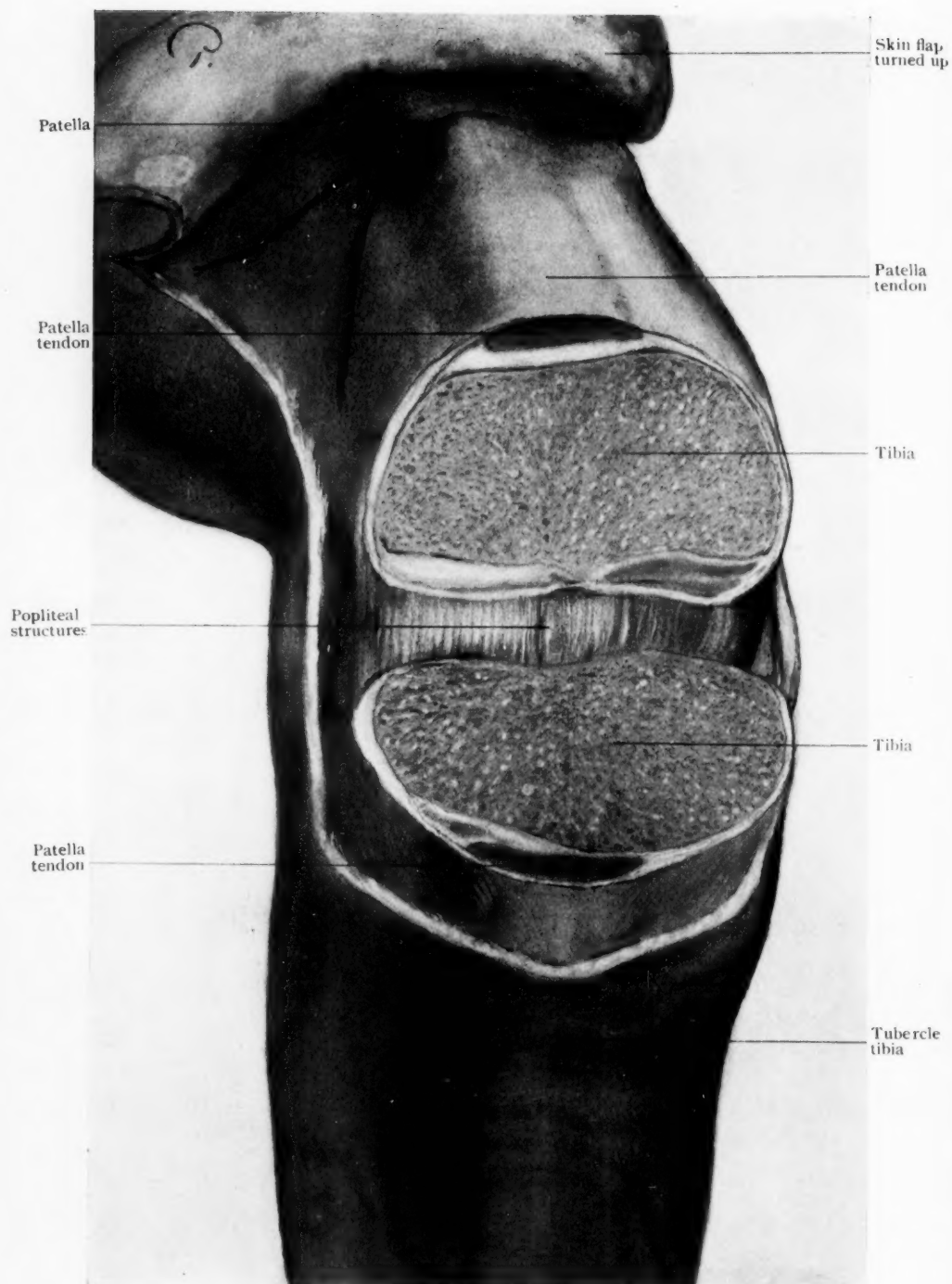


FIG. 4.—Tibia sawn through. Leg flexed. Structures at knee above fallen into place.

portion of the joint not removed serves as a starting point for fresh ravages of the disease. Kocher's method does not open the joint, but is subject to the other disadvantages.

It has seemed desirable to the writer to perfect some technique which did not open the joint and which would do away with the above-mentioned annoyances, and at the same time combine the advantages both of operations which do open the joint and of Kocher's method. It is my opinion that the following operation fulfils these requirements:

The skin incision should be rectangular, the two vertical cuts being well back at the sides of the leg, extending from a little above the level of the upper limit of the subcrural bursa to one inch below the joint line. These two vertical incisions are connected across the front of the tibia by a transverse incision (Fig. 1). This rectangular skin flap with the subcutaneous tissue is reflected upward.

The next incision is curved, the concavity upward. It starts in the vastus internus a little above the upper limit of the subcrural bursa and is carried down and outward in the direction of the muscle fibers to the tendon of the quadriceps extensor, one-half inch above the patella, and from here upward and outward in the direction of the fibers of the vastus externus to a point corresponding to the beginning on the inner side. The muscle with the tendon is completely divided and turned upward, thus exposing to view the subcrural bursa. We next make two small incisions on either side of the femur, starting on each side of the patella in the incision just described, and carried downward and backward to the joint line. The one on the inner side divides the tendinous expansion of the quadriceps, the one on the outer side the tendinous expansion and part of the iliotibial band. After completing these incisions the subcrural bursa is separated from the femur with the knife and turned down, tilting the patella when not adherent. The last incision in front is carried transversely across the front of the tibia down to bone just below the joint line (Fig. 2).

On the inner side the sartorius and gracilis are pushed back; on the outer side the biceps and peroneal nerve.

A flat retractor about one inch wide is now introduced on the inner side behind the head of the tibia close to the joint line. It is first introduced vertically between the gracilis and sartorius on one side and the tibia on the other. These muscles are pried off and the retractor brought to a horizontal plane, the apex passing behind the tibia. This retractor is now pushed outward always close to the bone until it emerges at the outer side. All soft parts are thus held back.

The next step is to saw through the tibia as close to the joint as circumstances seem to warrant, the leg being still flat on the table; the retractor being in place protects the soft parts (Fig. 3.)

The saw-cut through the head of the tibia is used as a joint. The femur is flexed on the body, the leg on the femur (Fig. 4), and with a large knife the soft parts are quickly separated from the posterior structures of the joint. By a little downward traction on the leg combined with the pull of its own weight injury to the vessels is easily avoided. This seems to be much more easily accomplished in this manner than by the operation which attacks the posterior structures of the joint from the anterior aspect. One has at least a better sense of security because one is perfectly sure of the relation of the vessels to the knife.

As soon as the posterior region of the condyles is exposed the femur is sawn through from behind forward and slightly downward at a level sufficient to clear the cartilage behind (Fig. 5.) This saw-cut is carried forward until it reaches the margin of the cartilage on the anterior surface of the femur, and the saw then withdrawn. The direction of this cut should be downward and forward so as to lose as little as possible of the femur and obtain the desired slightly flexed position of the bones subsequently. It is easy to be deceived as to the exact position of the cartilage behind. One's examination should be particularly careful at this stage of the opera-

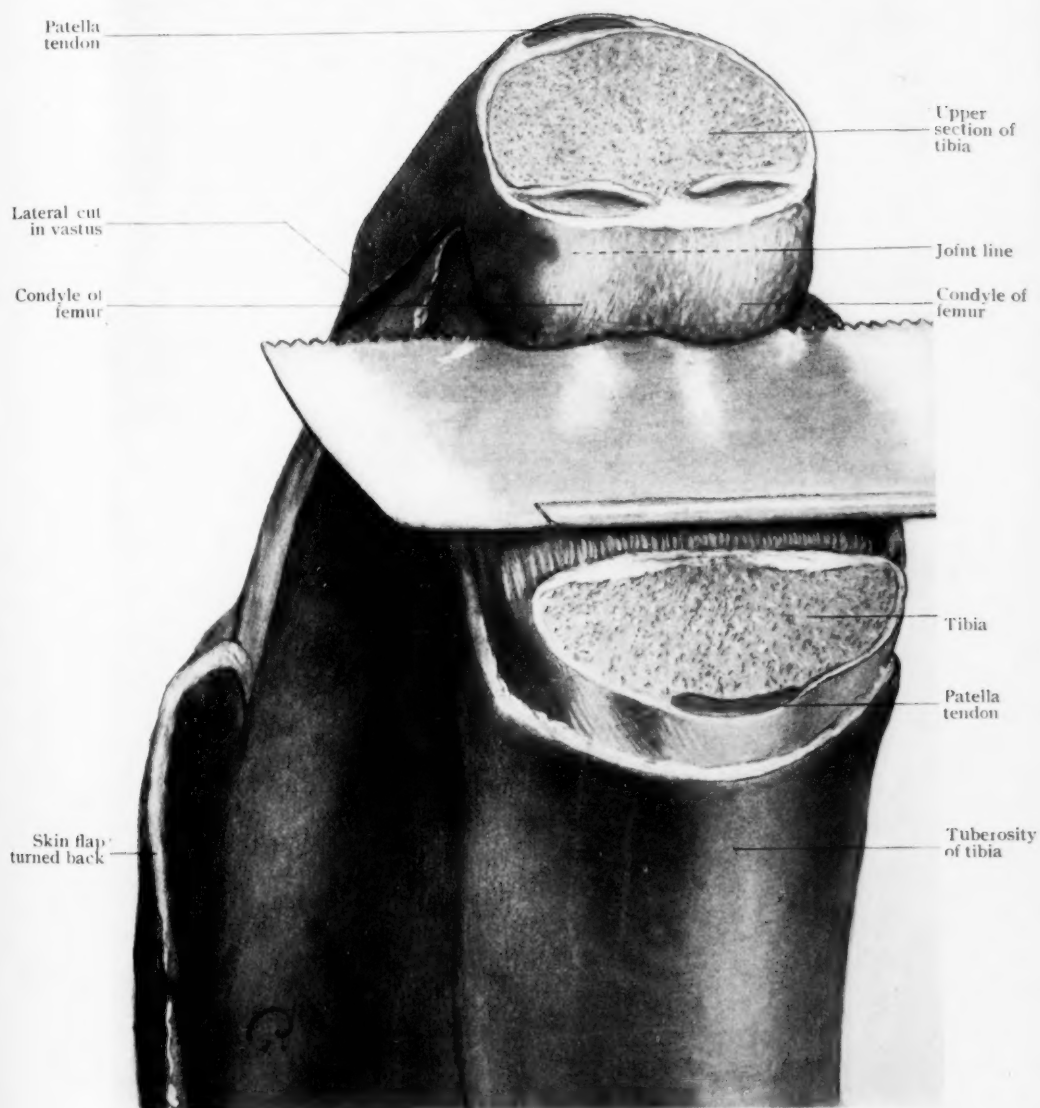


FIG. 5—Leg flexed on thigh—Condyles exposed. Saw in place for section of femur.

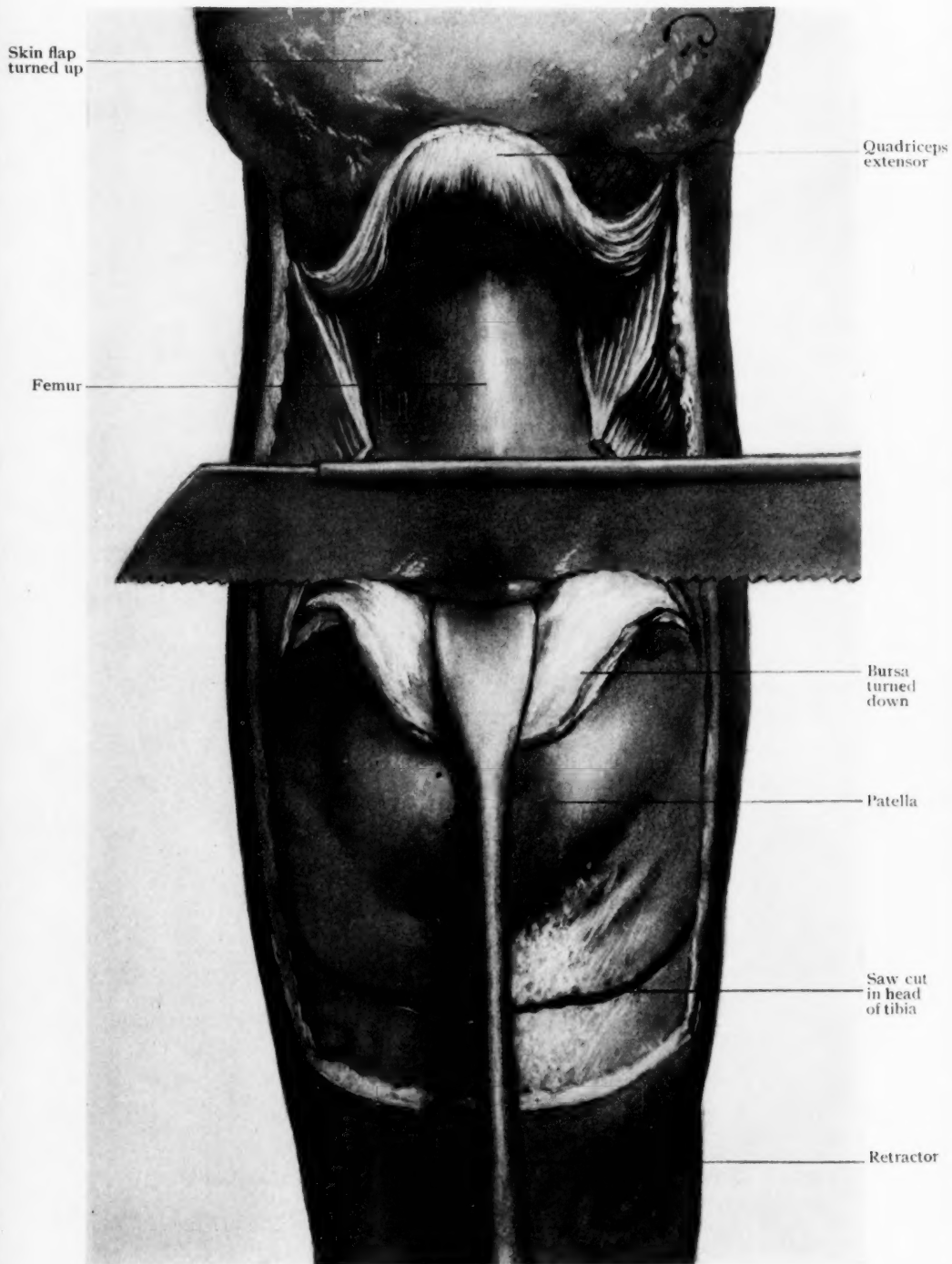


FIG. 6.—Leg horizontal. Bursa pulled down. Saw in place to remove trochlear surface of femur.

Subcrural
bursa

Patella

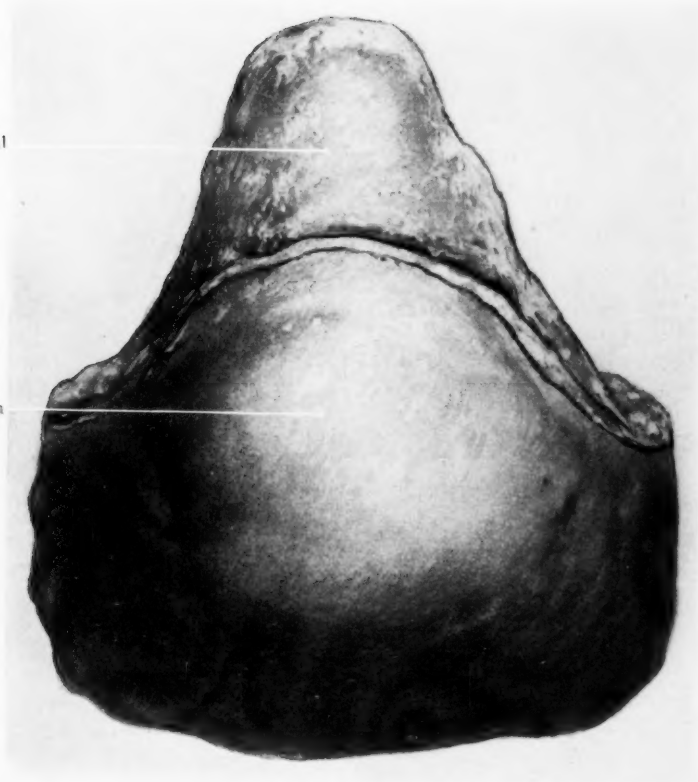


FIG. 7.—Joint removed without opening.

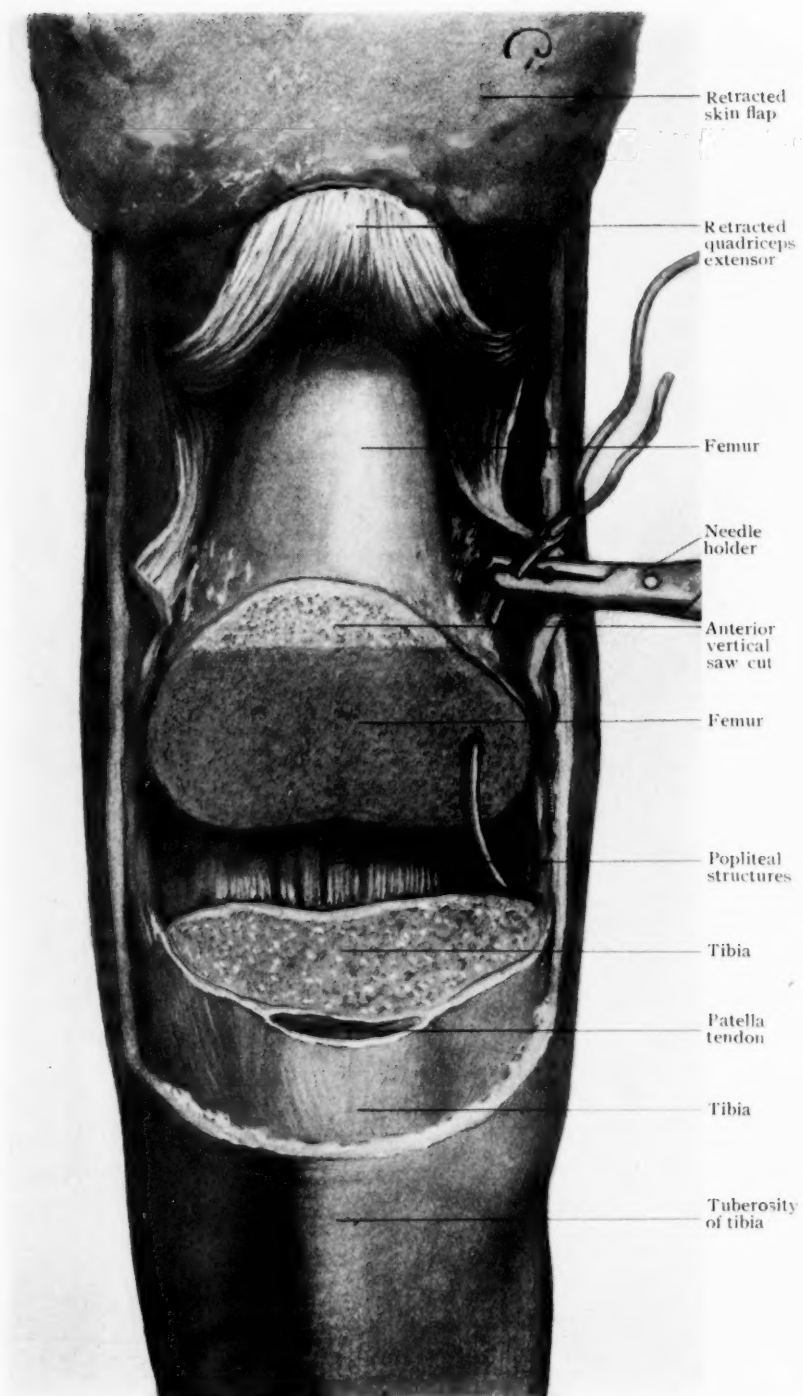


FIG. 8.—Joint removed—Hagedorn needle passed through femur.

tion, otherwise the saw-cut in the femur will be too high up.

After withdrawing the saw from the femur the leg is once more placed in a horizontal position. The saw is introduced behind the subcrural bursa at the upper margin of the articular cartilage on the front of the femur and a cut made which will meet the anterior limit of the horizontal saw-cut made from behind (Fig. 6). This last cut is almost vertical, in the coronal plane, and allows the articular portion of the femur which extends upward in front to be removed with the joint.

This is the last step of the incision proper, for it is now possible to lift out the joint with the patella and subcrural bursa, the articular surfaces of femur and tibia, all complete without having opened the joint (Fig. 7). Up to this point a tourniquet is used, but inasmuch as this part of the operation takes but little time, in fact about ten minutes, and in easy cases six minutes, we do not see the disadvantageous effects of longer use such as would be necessary to obtain complete hæmostasis in an operation which opens the joint transversely or dissects off the structures little by little. On removal of the tourniquet the bleeding points can be quickly clamped and tied, thereby reducing hemorrhage to a minimum.

The subsequent steps of the operation differ in no way from those hitherto customary.

The writer unites the bones with No. 4 chromic catgut, six stitches passed directly through the bone with a large curved Hagedorn needle (Fig. 9). It is usually unnecessary to bore holes. The cortical portion of the lower part of the femur and upper region of the tibia is so thin that it can readily be penetrated by a needle. The needle goes slowly at first and should be held in the holder about one inch from the point so as not to break. (See Fig. 8).

When examination of the cut ends of the bones reveals such an amount of disease left behind as to render curetting inadequate and demand removal of another piece of bone, then we are liable to get into the region where the cortex is so

thick as to make this method of suture impracticable. In such a case we are obliged to resort to a drill.

After the suture of the bone the muscle and skin flaps are turned down and sutured in place. As a rule the amount of retraction in the rectangular skin flap about compensates for the shortening due to resection, so that secondary trimming of the skin is not necessary.

While suturing bone and soft parts and during the time the plaster dressing is being applied the leg should be carefully held in proper position by an assistant.

There are of course extreme cases either with very little tuberculous disease or with very extensive involvement where this operation would not be feasible.

This method of resection has the following advantages:

1. It is quick.
2. There is very little danger of contamination of the wound by tuberculous or other infection from the joint.
3. Hemorrhage can be reduced to a minimum.
4. The operation is thorough, there being but slight chance of leaving diseased tissue behind, thereby diminishing the probability of recurrence.

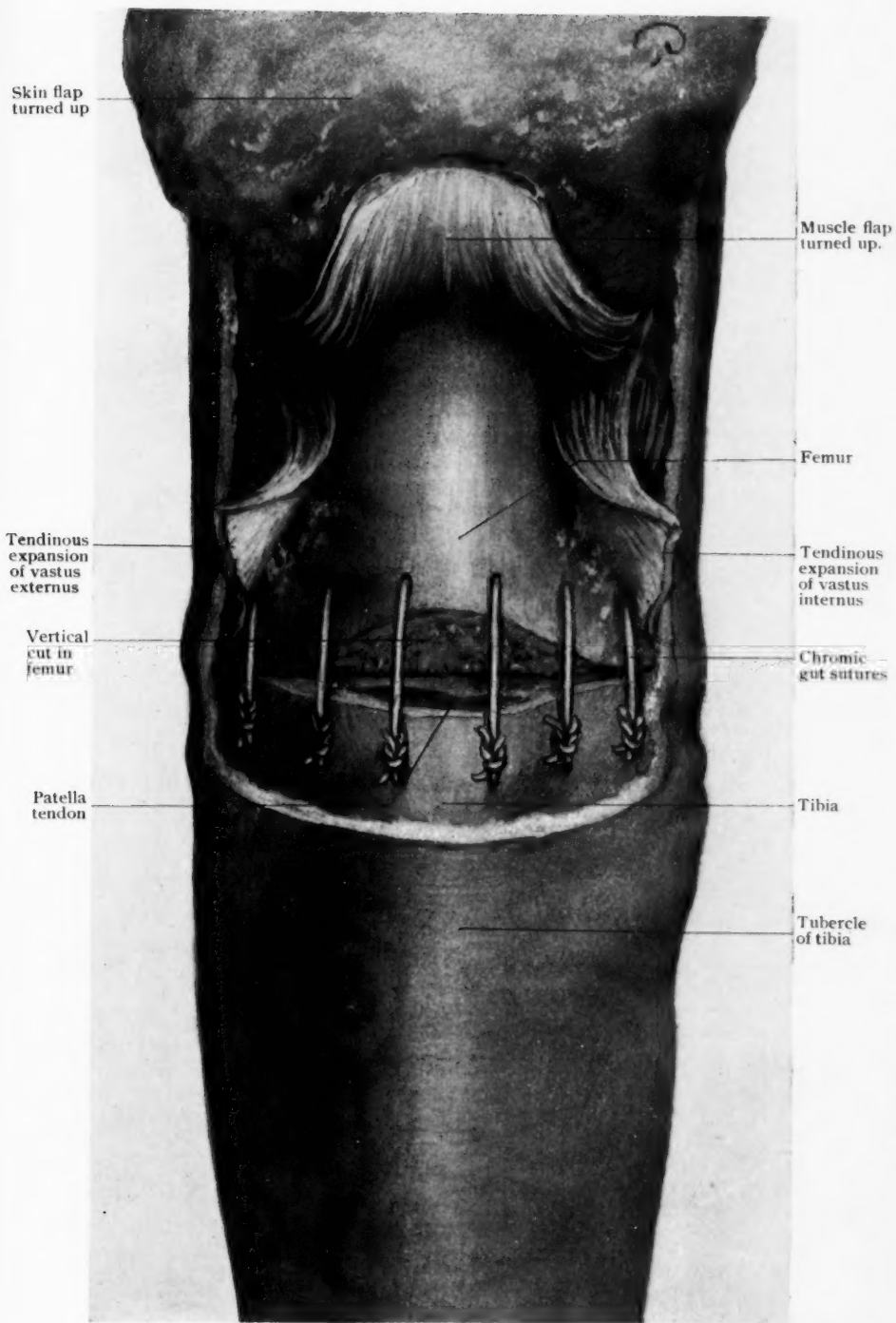


FIG. 9.—Femur and tibia approximated. Sutures in place.

THE EFFECT UPON GLANDULAR TISSUE OF EX- POSURE TO THE X-RAYS.¹

BY WILLIAM J. TAYLOR, M.D.,

OF PHILADELPHIA,

Attending Surgeon to St. Agnes Hospital, and to the Orthopædic Hospital; Con-
sulting Surgeon to the West Philadelphia Hospital for Women.

THE beneficial effects of the X-rays are so enthusiastically proclaimed by the advocates of its therapeutic use in granular swellings and certain of the new growths, that I think a few of its disadvantages should be spoken of by those who see the after effects and who are forced to operate upon tissues that have been long under its influence. My own personal experience is such as to lead me to advise against the employment of the X-rays wherever there is a probability of the case coming to a formal surgical operation. On account of the alteration in appearance and character of the tissues where its use has been prolonged, operations which would ordinarily be simple and easy dissections become formidable and dangerous, as the tissues are thickened and matted together by fibrous material.

This change in the character, both of the surface skin and underlying tissue, is particularly well marked in cases of enlarged cervical glands,—the so-called tubercular adenitis. Ordinarily operations for this condition are easy to perform, the glands readily peel out by blunt dissection, and the blood-vessels and nerves retain their distinct characteristics, thus being plainly recognized and preserved from injury. The physical characteristics of the tissues of the necks which have been subjected to treatment by the X-rays are, however, markedly changed in appearance; the glands become hardened, and may be shrunk if this method of treatment is employed before they have broken down, and while it is true

¹Read before the Philadelphia Academy of Surgery, December 4, 1905.

that in cases of recent origin many of the swollen glands may entirely disappear, this is not usual. The majority of the glands which the surgeon sees have already broken down and softened in their interior, and the cheesy pus may be simply incapsulated. It is of this variety particularly that I wish to speak.

Most of these cases are of long standing and have been subjected to various plans of treatment by ointment, massage, counter-irritants, etc., before the X-rays are employed. It is only after all the various methods have been tried that the surgeon is requested to operate.

The overlying skin is now found to be thickened, indurated, and much toughened. The glands cannot be peeled out, or pulled away from the blood-vessels and nerves by blunt dissection, but each step must be taken with the greatest deliberation and every particle of tissue that is removed must be separated by cutting with the knife or scissors. The blood-vessels, from the fibrous thickening of their sheath and the surrounding tissues, cannot be easily distinguished; and are only saved from being cut by the utmost vigilance. The dangers, the difficulties, and the time consumed in the operation are thus very materially increased, and my own belief is that the only action of the X-rays in these cases is distinctly harmful.

I have had one case of cystic disease of the left breast in an unmarried woman of 37 where the X-rays were employed, and which subsequently came to operation. The history was that a year before she had discovered a lump in her left breast, but it gave her no discomfort. She consulted a physician, who advised operation, but as her father was very ill and she was nursing him, she refused operative treatment at that time, as she would not leave him. Her family history was bad, as her mother had had cancer of the uterus and her father's illness was supposed to be cancer of the stomach. She elected to try the value of the X-rays and submitted to twenty-eight treatments of ten minutes each. As a result there was an extensive burn of the skin of the

whole breast; the outer layer of the skin peeled off, and this was true also of the areola and nipple. I saw her first when this burn was at its worst. I could feel that the breast was enlarged and that in the gland there was a swelling, which I took to be, and still believe to have been, a cyst. Shortly after this her father died and she then came to me and submitted herself to operation.

The skin over the whole of the breast was very dense and hard and in a condition such as I had never seen before. It was almost impossible to cut through the skin with a very sharp knife without using extreme force. The breast and both pectoral muscles were removed and the axilla cleaned out. At this time I could not distinguish definitely a tumor, but the whole breast was thickened and indurated. The breast, after its removal, was cut open and macroscopically seemed to be simply a mass of fibrous tissue with few of the characteristics of the normal gland. There were one or two small retention cysts. She made an absolutely uneventful recovery, but the wound did not heal quite as rapidly as is usual. The breast was sent to Dr. Longcope, of the Ayer Laboratory, who made this report:

The specimen consists of a breast, pectoral muscle and axillary fat. Section has been made through the breast. It is covered by a piece of skin 1 cm. in diameter. The center appears yellowish and slightly ulcerated. On section the cut surface discloses opaque white breast tissue, which is slightly larger than normal. It is fairly well circumscribed and has a more or less pyramidal form. The margins are well defined, particularly the lower margin, which is separated from the pectoral muscle by a zone of fat about 1 cm. in thickness. The breast tissue is quite firm but flabby. Scattered through it can be seen bits of fat. Here pectoral muscle appears normal. The axillary lymph glands are small, soft and pink in color.

Sections are made from all parts of the breast. They show a coarse net-work of rather dense fibrilated connective tissue enclosing lobules of fat-cells of various sizes. The connective tissue contains extremely few cells. In many sections the acini are lined by two regular rows of cuboidal epithelium which do not differ essentially from the normal, except that many of the

cells contain large fat droplets. Sections through four of the axillary lymph nodes show chronic inflammatory changes. There is some hyperplasia of the lymphadenoid tissue with thickening of the reticulum, especially in the lymph sinuses and proliferation of the reticular cells.

The lymph sinuses are converted into solid cords. The capsule is regular but a little thickened.

Skin.—The epidermis is thickened. At one point there is a small area of ulceration. Here the corium is covered with a thin layer of fibrin. Polymorphonuclear leucocytes and red blood-cells. The corium is greatly thickened and the papillary process atrophied. It consists of rather dense connective tissue infiltrated in circumscribed foci by cells usually of one type. These cells are scattered through the corium, but are most numerous beneath and about the ulcerated surface. They are somewhat smaller, irregular, often have a shriveled appearance and the protoplasm stains intensely blue in hæmatoxylin and eosin stains. The nuclei are very black and piknotic. Sometimes they show a central unstained band which gives the nucleus the appearance of a diplococcus. About the ulcerated area there are also many small round cells, a few polymorphonuclear leucocytes and occasional large multinucleated giant-cells.

Diagnosis.—Chronic mastitis with atrophy of mammary gland. Chronic inflammation of skin with thickening of corium. Chronic inflammation of axillary lymphnodes.

Dr. Longcope states in a letter which accompanies this report that there was no evidence of malignant growth, but, on the contrary, there was marked atrophy of the glandular tissue with extensive fibrous overgrowth in a diffused manner. He considers the thickening of the skin must have been caused by the X-rays, but whether the changes in the breast itself are due to this cause he cannot state positively.

In a very carefully written article by Dr. A. G. Ellis, "The Pathology of the Tissue Changes Induced by the X-Ray" (*American Journal of Medical Sciences*, January, 1903), he quotes Huntington as stating that the X-ray burn consists of an acute, subacute, or chronic necrobiosis. He

quotes Rudis-Jicinsky as saying that, "The irritation of the peripheral extremities of the sensory nerves causes paralysis of the vasomotor and vascular cells affected. Spasmodic contraction of the arterioles and capillaries follows and the proper nutrition of the cells is impaired. With these changes, which are directly depending upon disturbances of the circulation, there are changes in the parenchyma cells of the affected region. The death of tissue follows, being caused by permanent stasis in the blood-vessels. This is carried out by Codman's statement (Ellis) that the reports of microscopic examinations of the excised tissue agree in stating that similar arterial branches are occluded and the appearances are not unlike those of necrosis and inflammation due to other causes.

Scholtz (Ellis) says that the cell elements under the influence of the X-rays undergo a slow degeneration, chiefly in the epithelial cells; that the nucleus as well as the protoplasm of the cell is affected. This article by Dr. Ellis is so exhaustive and carefully prepared that it should be read by all who are interested in this subject.

In the X-rays we have a very powerful therapeutic agent, whose power for good is undoubtedly very great in inoperable malignant disease of a superficial character and as a prevention of the recurrence of malignant disease after radical operation; but I believe that its use should be confined to this class of cases. I do not believe, in view of the extreme difficulties and complications which are produced by its effects, that it should ever be employed upon the tissues before surgical operation is undertaken.

TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, December 13, 1905.

The President, DR. GEORGE WOOLSEY, in the Chair.

EXCISION OF THE TONGUE FOR EPITHELIOMA.

DR. CLARENCE A. McWILLIAMS presented a woman, 24 years old, who was admitted to the Presbyterian Hospital early in August, 1902, complaining of a painful lump on the side of her tongue, which she had first noticed about three months previously. The pain had gradually increased in severity, and extended down the neck. As chewing solids was very painful, she lived chiefly on fluids, and had lost flesh and strength.

Examination showed a hard, superficial lump, about the size of a silver dime, situated on the left side of the tongue. There was no ulceration. The centre of the mass was slightly depressed, and its edges somewhat elevated, with radiations into the adjacent tissues. It did not extend to the dorsum of the tongue, but impinged slightly on the mucous membrane of the mouth, but not as far over as the attachment of the mucous membrane to the lower jaw. The tongue was freely movable. One gland, the size of a marble, could be felt under the angle of the left jaw.

A section removed from the growth was examined microscopically, and showed flat-celled epithelioma, full of epithelial pearls.

A number of sharp, decayed stumps of teeth opposite the mass on the tongue were removed and on August 20, 1902, the patient was operated on by Dr. McWilliams. An incision was

made from the middle of the jaw downward to a point just below the cornu of the hyoid bone, and thence up to the angle of the jaw. This flap was dissected up, exposing the enlarged sub-maxillary gland, which extended down to the cornu. The external jugular was ligated and divided, and all enlarged glands in the submaxillary triangle were removed. The lingual artery was ligated, together with its vein. The patient's head was then turned strongly to the right, the right side of the tongue transfixed by a silk thread, and drawn fully out. An incision was made on the dorsum of the tongue, widely encircling the epitheliomatous mass, and extending deep into the muscles of the tongue and over to the attachment of the mucous membrane to the jaw. The knife, passed from below, then divided the attachment of the mucous membrane from the jaw, and the entire mass was removed, together with the enlarged submaxillary and sublingual glands, in one piece. The hemorrhage from the tongue was controlled by means of two clamps. Three gauze drains were introduced from below. The raw edges of the tongue were brought together with catgut, excepting for a distance of about one inch posteriorly. The wound below was closed as far as possible with interrupted silk sutures. An inch and a quarter of the anterior lateral portion of the tongue was removed.

The patient made a satisfactory recovery and as a prophylactic measure submitted to X-ray treatments to the neck for about a year afterwards. Temporary paralysis of the left lower face followed the operation. This has almost but not entirely disappeared. Over three years have now elapsed without sign of a recurrence. The patient's speech is perfect. She has since married, and borne one child.

DR. L. W. HOTCHKISS reported three cases of cancer of the anterior portion of the tongue upon which he had operated during the past two years. In one the patient was now in his second year and showed no signs of a recurrence. In the second, a recurrence had taken place about eighteen months after the operation in the tip of the portion that was left. The third case was that of an old woman with a small epithelioma of the tip of the tongue, in which a wedge-shaped section was removed. In all of the cases, the operation was done through the mouth.

RESULT OF RESECTION OF ELBOW AND HIP AFTER TEN YEARS.

DR. MCWILLIAMS presented a patient who was admitted to the Presbyterian Hospital in January, 1896. He was 13 years of age. Eight months prior to the time of admission he fell, injuring his right hip, which became swollen. For the past five months he had been confined to bed, and two months prior to his admission the right elbow had become involved with the formation of a sinus. Sinuses had also formed over the left hip. The lungs were healthy.

On January 31, 1896, Dr. Charles K. Briddon resected the elbow, sawing through the ulna just below the coronoid process, and through the neck of the radius at a corresponding point. The humerus was removed nearly to the epiphysis. The arm was put in full extension for two weeks; then in mid-flexion.

Three weeks after the first operation, Dr. Briddon resected the necrosed head of the femur at its junction with the neck, and thoroughly curetted all the sinuses. Buck's extension was then applied to the leg.

The patient improved rapidly, and left the hospital on June 15, 1896. The affected leg was two inches shorter than its fellow, but the motion was good. The function of the right elbow was excellent, with good rotation and flexion to the extent of a right angle.

At the present time flexion and extension of the elbow are perfect, but there is some lateral mobility, which does not impair the usefulness of the arm, which can be used perfectly for all ordinary purposes. His favorite amusement is throwing a baseball. An X-ray photograph shows a posterior displacement of the radius and ulna on the humerus. He is able to walk without the aid of a cane, although there is a shortening of the limb of about two inches. The X-ray photograph shows a displacement of the neck of the femur above the acetabulum.

PARTIAL GASTRECTOMY FOR CARCINOMA.

DR. LUCIUS W. HOTCHKISS presented a young man of 23, who was admitted to The Hood Wright Hospital on October 9, 1905, with typical symptoms of carcinoma of stomach, of three months' duration.

Examination showed a fairly well developed, but thin and anæmic man. A tumor, about the size of a large hen's egg, was felt in the epigastric region. It was freely movable, and could be pushed from side to side and up under the ribs. It was hard and nodular, and moved slightly with respiration. It was slightly tender to pressure. On admission, the patient's temperature was 100; pulse, 72; respiration, 20.

Operation, October 20, 1905. Through a median laparotomy wound the abdomen was opened, and a movable mass was found invading the posterior wall and pyloric end of the stomach. There were some enlarged glands in the greater and lesser omentum, and one point of adhesion between the omentum and stomach. There were no adhesions posteriorly. The lesser omentum was ligated and divided close to the liver. The greater omentum was then ligated as high up as the Hartmann-Miculicz line, and the stomach clamped off in such a manner as to include the whole of the lesser and a considerable portion of the greater curvature. The stomach was then divided between the clamps, and the diseased portion, including the pylorus, about one-third of the stomach walls and about an inch and a half of the first portion of the duodenum were removed. The cut ends of the stomach and duodenum were inverted by suture in the usual manner, and an anterior gastroenterostomy was made by suture between the lower part of the anterior wall of the remaining section of the stomach and the jejunum.

After the operation, the patient was nourished entirely by enemata for three days, and then, as there was no vomiting after the second day, small sips of water, hot clam-broth and peptonized milk were allowed at frequent intervals. On the ninth day the nutrient enemata were discontinued, and soft-boiled eggs were added to the dietary, and, a few days later, chopped meat, bread and soft diet. Barring partial failure of the external wound to unite, probably on account of the patient's anæmic condition, the convalescence was afebrile and without any drawbacks, and he was discharged from the hospital on November 21, 1905. At that time he was able to eat ordinary food and to digest it well.

Examination of the specimen removed showed a large growth projecting from the mucous membrane of the stomach,

involving the anterior and posterior walls and both curvatures of the stomach, and beginning to obstruct the pylorus. In its gross appearance it resembled a cauliflower-like growth projecting into the cavity of the stomach from its posterior wall, and infiltrating the gastric wall far beyond the limits of the projecting mass itself, which measured, roughly $3\frac{1}{4} \times 4 \times 4\frac{1}{8}$ inches. The pathologist reported the growth to be a carcinoma.

The patient had gained about fifteen pounds since he left the hospital, and his general health was much improved.

ACUTE TETANUS TREATED BY INTRASPINAL INJECTIONS OF MAGNESIUM SULPHATE.

DR. JOSEPH A. BLAKE presented a boy fifteen years of age, who was admitted to the Roosevelt Hospital on November 3, 1905, with the following history: Nine days before admission he had crushed off the ends of the first three fingers of the left hand. Two days before admission he commenced to have stiffness of the jaw and neck, and could not fully open his mouth. He also complained of pain in the back of the neck. The initial symptoms consequently developed seven days after the injury.

On the day of admission, the jaws could be separated for three-quarters of an inch; the sterno-mastoids were prominent and in spasms, flexion and extension of the neck were not painful; lateral motion was painful and limited. The following day there was little increase in the symptoms. That morning, Dr. Walton Martin, under nitrous-oxide-ether anæsthesia, dressed the fingers by curetting them, cutting off necrotic fragments of tissue and swabbing them with tincture of iodine. At the same time he injected into the spinal cord (introducing the needle between the fourth and fifth cervical vertebræ) forty cubic centimeters of antitoxin, and an additional twenty cubic centimeters into the median cephalic vein. That night the temperature rose to 102° ; there was increased stiffness of the neck and jaw, and commencing spasms of the vertebral muscles. The day following the operation and injection the rigidity had increased, there were commencing spasms of the muscles of the lower extremities, and opisthotonus. That afternoon thirty-five cubic centimeters of antitoxin were injected into the spinal canal

by lumbar puncture. The same night the patient's temperature reached 104.4° . On the second day following the first injection there was marked opisthotonus, but the contraction of the masseters had not increased. The temperature during this day was high, between 103° and 104° ; the pulse between 104 and 112, and the patient was evidently feeling the strain of the almost constant convulsions and severe pain. In twenty-four hours, 24 minims of Magendie's Solution had been required. His condition being very grave, it was decided to try the effects of the intraspinal injection of magnesium sulphate in controlling the convulsions; accordingly four and one-half cubic centimeters of a solution of magnesium sulphate, 25 parts in 100 parts of water, were injected by lumbar puncture, this being approximately the amount recommended by Dr. S. J. Meltzer for the production of anæsthesia.

Two and three-quarter hours after the injection the patient was stuporous, the spasm of the neck was lessened, the opisthotonus was gone, there was no effect from irritation of the trunk or extremities, but pricking of the face produced response. Six hours after the injection the mouth could be opened wide; the stiffness of the neck and back had disappeared; sensation was present in the face, trunk and legs; the arms and legs could be moved slightly; there was no pain, and the temperature had fallen to 102.6° ; the pulse to 104; the respirations were 14. The patient seemed drowsy, but took nourishment well. Nine hours after the injection, the temperature rose to 104° , but responded to an alcohol sponge, and fell during the next twenty-four hours to 101° .

During this time the convulsions were in abeyance; the jaw was relaxed, but at the end of the day following the day of the injection, there was increasing pain and stiffness of the neck and back muscles, and at 9 P.M. on November 7, thirty-three hours after the first injection, opisthotonus had returned. The same amount of magnesium sulphate was again injected into the spine, and was followed by the same improvement as was noticed after the first injection although it was followed by a rise in temperature to 103.4° .

The injection did not have to be repeated until November 9, at 10.30 A.M., an interval of thirty-seven and one-half hours

having elapsed. The opisthotonus and pain had then returned. At this injection, by advice of Dr. Meltzer, eight cubic centimeters of a 12.5% solution were used. The same good effects were noticed after this injection, excepting that the relief did not seem quite so marked as after the injection of the stronger solution. On November 10, twenty-nine hours afterward, the pain and opisthotonus having returned, a fourth injection was given; eight cubic centimeters of the 12.5% solution being used, the same as in the third injection. This was followed by a similar relief of the symptoms, and although there was a return of the stiffness of the neck and back muscles, and some pain, he was kept comfortable with morphine and chloral. His temperature reached normal on the thirteenth day of his disease, the seventh after the first injection of magnesium sulphate. On the sixteenth day of the disease, the convulsions, which during the preceding days had resembled those of a case of chronic tetanus, became much more pronounced and violent, and a fifth injection of eight cubic centimeters of the 12.5% solution was given. The relief after this injection persisted, and he gradually improved and was practically well by December 1. During his illness, the wound was dressed daily with weak iodine water.

Dr. Blake said that the following conclusions might be derived from this case: That repeated intraspinal injections of magnesium sulphate may be safely given; that they have a marked effect in restraining the convulsions and relieving pain, probably by inhibition of both afferent and efferent impulses; that the restraint of the convulsions diminishes metabolism and heat production; that, probably, the spasm of the muscles of mastication is diminished, although that was not proven by this case, since the jaw was not closed at any time; that in this case the period of control of the convulsions was about thirty-six hours (twenty-nine to thirty-seven and one-half) but that this period, judging from the effects of magnesium sulphate in other cases, will probably differ in different individuals.

Of course, there was nothing specific in the action of magnesium sulphate in tetanus. Its exhibition was symptomatic. If its effects would prove as beneficial in other cases as they had in this, it would at least be of great value in controlling the convulsions and preventing exhaustion. It is difficult to say how

much benefit had been derived in this case from the injections of the antitoxin.

DR. ROBERT H. M. DAWBARN mentioned a case of acute tetanus treated by him at the City Hospital by means of intraspinal injections of the Board of Health antitetanic serum in large doses. This case ended fatally, and shortly afterwards, the speaker said, he met Dr. Richard Kalish, President of the Hospital Board of Physicians, who stated that many years ago, while serving as an interne at Bellevue Hospital, eight cases of lockjaw came under his care. The first five of these cases were treated in the usual way, with bromides and chloral in large amounts, and all ended fatally. The three remaining cases, which were equally severe, were given very large hypodermic injections of the fluid extract of *physostigma venenosum*, and all three recovered.

Dr. Dawbarn added that it seemed to him a better plan, if we wished to test this claim, to inject an alkaloidal salt of physostigmine (*eserine*), say the salicylate, which is officinal, instead of using the fluid extract of the crude drug; for in this way we avoid introducing calabarine too—which is the spinal-excitant principle, resembling strychnine in effect, less in amount than physostigmine, in the drug, but always present.

Dr. Dawbarn said the objection that might be raised to the use of chloral in tetanus on the ground that it weakened the heart action did not apply to physostigmine. Those two remedies should not be classed together. The latter drug possessed the peculiar quality of increasing the force of the heart's action, and at the same time diminishing its frequency, even though all the nerves of the heart be cut (quoting H. C. Wood's "*Materia Medica*"). The only reason that with its desirable properties physostigmine is not used as a heart tonic is its motor depressant action upon the spinal cord, which is the cause of its employment by Dr. Kalish in the cases quoted. Dr. Dawbarn added that Dr. Kalish agreed that he should as a duty have reported these instances without delay; and had authorized the speaker to do so now.

DR. ALEXANDER B. JOHNSON said that a few days ago he saw a case of acute tetanus in which the intra-spinal injections of magnesium sulphate were of no avail.

DR. SAMUEL J. MELTZER said the case reported by Dr. Blake furnished corroborative evidence of a number of facts. One was, that repeated intraspinal injections of magnesium sulphate had produced no injurious after-effects; another was that the injection of the salt was immediately followed by a relaxation of the tonic and clonic contractions of the muscles, and furthermore, that the opisthotonus and trismus and contraction of the facial muscles were at once relieved. This showed that the effects of the drug extended as high up as the origin of the cerebral and cervical nerves. These same results of the intraspinal injections of magnesium sulphate he had observed in a more extensive and reliable way in animals, especially in monkeys. Repeated experiments in monkeys had shown that the most severe forms of opisthotonus and trismus could be relieved in a very short time. The effects of the drug were first observed in the lower extremities, and then spread over the entire body.

RECURRENT VOLVULUS OF THE SIGMOID FLEXURE.

DR. JOSEPH A. BLAKE presented a man, 63 years old, who was admitted to the Roosevelt Hospital, the first time, on December 31, 1902, with a history of chronic constipation of an extreme type for the previous five years, and complete obstruction, with fecal vomiting, of five days' duration. Operation revealed a volvulus of 360°, of the sigmoid flexure. The loop was enormously distended, but not gangrenous, and on lifting it from the abdomen, it had to be incised to prevent its bursting. After it had been emptied, it was sutured to the abdominal wall through a second intermuscular incision in the left iliac region. Immediate convalescence was uneventful, but he returned to the hospital seven weeks later with an abscess in the lateral wound where the gut had been sutured. This was evacuated, and a few days later he developed all the symptoms of acute intestinal obstruction. A diagnosis of obstruction at the point of suture of the gut to the abdominal wall was made, and the gut was opened at this point through the incision made for evacuation of the abscess. This gave him immediate relief, and in a few days, normal evacuations, per anum, were reestablished, and the colostomy wound closed of itself.

The patient was next seen a year later, when he returned to the hospital on January 13, 1904, with another attack of volvulus. Median cœliotomy was again performed, and a condition exactly like that present at the first operation was found. There was absolutely no sign of adhesion of the sigmoid to the abdominal wall, to which it had been sutured at the first operation, and no evidence of the colostomy. The gut wall, however, was markedly thickened, and showed numerous striæ of adventitious connective tissue. The loop, which was much distended, was untwisted and emptied through a rectal tube introduced per anum. He left the hospital in good health a month later.

On November 14 last he again returned to the hospital with the same symptoms of obstruction, this time of three days' duration. His condition was good, although the vomitus had been feculent for twenty-four hours. Immediate cœliotomy was performed, the incision being made just to the left of the old median scar. The incision was carried very carefully down through the old scar tissue for fear of injuring adherent intestine, but with all this precaution, a loop of the ileum which had become imbedded in the scar was incised. Attention was first attracted to it by its persistent bleeding. It now became necessary to separate the gut in order to repair it, which proved to be an almost hopeless task, inasmuch as a large area of adhesive peritonitis had formed, gluing loops of small intestine together and to the abdominal wall in an almost inextricable mass. It required an hour of careful and patient dissection to separate these, and by this time the wounded loop was so injured as to demand a resection of about six inches. This was done, and an end-to-end suture made.

The volvulus of the sigmoid flexure was then uncovered, and found to be twisted through two complete turns, the loop having insinuated itself through an opening between the adherent coils of small intestine. It was reduced, and the distended loop emptied with a rectal tube per anum as in the previous operation. The gut showed still more thickening, and its mesentery was dense, and much narrowed.

The patient's recovery was uninterrupted, save for a stitch abscess. The only permanent cure for this case would be excision of the entire sigmoid flexure. One would hesitate to do

this during an attack, and the age of the patient would hardly warrant it as an interval procedure. Moynihan excised the sigmoid flexure in a case of volvulus that had recurred a second time.

This patient has had three attacks of volvulus, and one attack of ileus, due probably to a kink from a misdirected attempt to anchor the loop.

TYPHOID PERFORATION OF THE ILEUM.

DR. WOOLSEY reported the history of a boy of 17, who was admitted to the medical division of the Presbyterian Hospital on May 29, 1905, with typhoid fever. He ran an irregular temperature for eight days; then it fell to normal and remained so for nineteen days. The Widal test at that time was negative. On the thirty-first day after his admission to the hospital there was apparently a relapse of his typhoid fever, with a temperature as high as 104, and new rose spots. The Widal reaction was still negative. The leucocytosis was 6,500.

On the thirty-fourth day of his relapse (June 28), the temperature was irregular, with a downward trend. On that day the patient first complained of pain in the right lower quadrant of the abdomen, radiating into the scrotum and penis. There was marked tenderness on both sides, especially below the umbilicus. The recti were markedly rigid. Liver dulness was normal. Five hours later the temperature had risen from 101 to 105, with a pulse of 118; respirations, 28. The leucocyte count was 7,700. There was no vomiting. Abdominal respiration was restricted, and absent in the lower half. The abdomen was universally tender, and there was rigidity below the umbilicus. There was slightly shifting dulness in the flanks; no fluid wave.

Six hours after the first symptoms of perforation, an incision was made through the right rectus. The peritoneal cavity contained a considerable amount of free greenish fluid, of foul odor, but no gas. A perforation of the gut, about one-quarter of an inch in diameter, was discovered about fifteen inches from the ileocaecal valve. A purse-string suture was applied, but on drawing it tight it cut through, and was thereupon replaced by two rows of silk Lembert sutures. The peritoneal cavity was

then irrigated with saline solution, and a large, rubber drainage-tube with gauze core was inserted into the pelvis.

The patient made a good recovery from the operation, and his temperature had dropped to 99 the next morning. It remained low until the fifth day, when it rose to 103. From that point it gradually fell, and never went above 102. The drainage-tube was removed on the third day, and the sutures three days later.

Subsequently, the edges of the wound separated, and were brought together by strapping.

A curious feature in connection with the case was that the temperature of the relapse persisted for 60 days, but during its course declined as if at the close of the relapse and then rose suddenly and continued higher, indicating, apparently, a double relapse. After recovering from his second relapse, the temperature remained normal for nine days, then again became elevated, accompanied by new rose spots, a palpable spleen, etc. It finally dropped to normal on the one hundred and seventh day of the disease, and remained so, and the patient left the hospital, cured, on the one hundred and forty-sixth day.

Dr. Woolsey said that this was the third case of typhoid perforation that he had operated on last summer, and it was the only one that had recovered. In one of the fatal cases the perforation was in the ileum, and the operation was done too late. In the other case, there were no perforations in the ileum but two perforations of the sigmoid flexure. A large area of the sigmoid was in a semi-necrotic condition.

METALLIC FOREIGN BODIES IN A BRONCHUS.

DR. GEORGE R. FOWLER read a paper with the above title.

DR. B. FARQUHAR CURTIS had recently operated upon a boy, ten years old, who inhaled the metal cap of a pencil, which was located in the left bronchus. The symptoms were almost the exact counterpart of those in one of the cases recounted by Dr. Fowler. The obstruction produced complete loss of respiration on the affected side, excepting in the upper lobe. There was a slight cough, and the patient's temperature gradually rose to 101. A low tracheotomy was performed, a curved uterine forceps was introduced through the wound, and the foreign body was

easily found and removed. The boy made an uneventful recovery, in spite of the fact that the withdrawal of the pencil cap was followed by several drams of pure pus.

Dr. Curtis was inclined to believe that an ineffectual search for a foreign body through the tracheotomy wound should not be persisted in for longer than half an hour. If, at the end of that time, the patient's condition warranted it, he should be immediately turned over and the chest opened from the back. Some years ago he had published (*ANNALS OF SURGERY*, 1898,) the case of a boy who had inspired a dried berry with a pin thrust through it. The X-rays failed to throw any light upon the position of the foreign body, but the physical signs showed that it was in the right bronchus. It was located through a deep tracheotomy wound, and efforts were made to grasp it, but these proved unsuccessful, and were abandoned after three-quarters of an hour. At this time, three days after the accident, symptoms of pneumonia were already present. The following day the chest was opened from the back, but owing to the lack of proper instruments to retract the lung, the foreign body could not be reached. After waiting another twenty-four hours to allow pleural adhesions to form, the bronchus was reached and opened but the foreign body could not be extracted owing to its softened state. The patient died two days later of pneumonia.

His experience with this case had convinced him on two points: First, That attempts to remove a foreign body in the bronchus through a tracheotomy wound should not be too prolonged; and, second, one should not wait until the next day to open the chest from behind, but should proceed immediately with that operation.

Dr. McWILLIAMS reported a case recently seen by him at the Presbyterian Hospital, in which the value of the bronchoscope was well illustrated. The patient was a child of five years that two days prior to its admission to the hospital had inspired a bean. An examination of the chest revealed dulness and diminished breathing on the right side, with many râles. The X-ray showed nothing. The following day the physical signs indicated a general bronchitis, with an increased area of dulness and a loss of breathing sounds. The case was regarded as one of foreign

body in the bronchus. Dr. Emil Mayer saw the patient and introduced his bronchoscope through a low tracheotomy wound, and readily located the bean at the bifurcation of the right bronchus. Then, with another instrument, he grasped the bean, but it was so brittle that it broke, and had to be removed piecemeal. The child died on the following day of pneumonia. The speaker called attention to the fact that it required considerable dexterity to use the bronchoscope, although no more skill is necessary than in the use of the cystoscope or endoscope. The bronchoscope promises to solve all the difficulties attendant upon the extraction of foreign bodies of all kinds from the bronchi.

DR. OTTO G. T. KILIANI mentioned a case that he had reported at a meeting of the Society about a year ago. The patient, a boy, was holding a silver horse-shoe pin between his teeth. His room-mate, in order to get possession of it, grasped the boy's nose, and the pin was suddenly inspired into his larynx. The boy at once came to New York, and a tracheotomy was done, and the pin was coughed up through the wound. It had given rise to no symptoms, and had been located in the left bronchus. The patient made a rapid recovery. In another case that he saw, the foreign body was a military uniform button, which was removed from the left bronchus through a tracheotomy wound by means of a forceps.

In both of these cases, Dr. Kiliani said the bronchoscope was tried, but it was exceedingly difficult to do anything with it. Its use required a good deal of practice.

DR. CHARLES H. PECK mentioned a case of a pin in the left bronchus which was operated on by Dr. Robert F. Weir. The patient was a child, two years old. The pin, which was located with the X-rays, had a spherical, gold-plated head, which rested on the secondary bifurcation of the left bronchus. A low tracheotomy was done, and the pin was removed after one or two trials with a slender pair of forceps.

DR. GEORGE D. STEWART said his assistant had made some experiments by introducing shot into the trachea and subsequently locating them with the X-ray, and he had found that the right bronchus, instead of being more horizontal than the left, was more vertical which furnished another reason why foreign bodies more frequently found their way into the right tube.

He reported a case that came under his observation, in which a lima bean had been inspired and had lodged in the right bronchus. A low tracheotomy was done, and an attempt made to grasp the bean, but the instrument used was so large that the patient ceased to breathe. A flexible rubber catheter was introduced, passing the bean and entering the left bronchus. During further manipulation oxygen was administered. A smaller forceps was introduced beside the catheter and the bean was extracted. The patient recovered.

Another case was that of a small boy, who, while sucking some candy that contained a whole almond, had a violent paroxysm of coughing, and the candy suddenly disappeared. The family physician was sent for, who thought the candy had been expelled. The paroxysms of coughing, however, persisted for several days, and the boy was then brought to the hospital. One of the physicians connected with the hospital examined the chest and found evidences of bronchitis, but believed there was no obstruction of the bronchus. To Dr. Stewart it appeared, however, that there was lessening of the volume of air inspired into the right lung particularly over its upper lobe. The X-ray showed nothing. An examination of the chest was apparently negative. As the boy's temperature was gradually going up, a low tracheotomy was done, and an almond, an inch and a quarter long, was removed from the right bronchus. Its larger end pointed downward, while its smaller end protruded into the trachea. Some pus followed the extraction of the nut, and the boy eventually made a good recovery.

DR. FOWLER, in closing, said that thus far he had never had a case in which he considered posterior thoracoplasty justifiable, and in the light of the experience of others he was inclined to regard posterior thoracoplasty as the most difficult and probably the most impracticable operation in surgery. In desperate cases it might be justifiable, but it should not be offered with much hope of success.

The bronchoscope introduced by Kiliani some years ago, was simply a urethroscope on a little larger scale. The foreign body could not be extracted with the bronchoscope; it would simply help in guiding the forceps, and large foreign bodies would not pass through the lumen of the instrument. Further-

more, as had already been pointed out, it was exceedingly difficult to manipulate it without much practice.

A LEAD PENCIL REMOVED FROM THE CÆCUM.

DR. GEORGE D. STEWART showed this specimen. The patient from whom it had been removed was a longshoreman, 31 years old, who came to St. Vincent's Hospital with the history that for the past two years he had had repeated attacks of pain in the right iliac region, with occasional vomiting. These attacks lasted for two or three days; sometimes a week, and compelled him to give up his work.

Examination of the abdomen revealed a small, rather hard and sensitive tumor in the right iliac region directly under McBurney's point. The case was regarded as one of appendicitis, and when the abdomen was opened, four days ago an inflammatory mass was found with dense adhesions to the anterior abdominal wall. Upon inserting the finger, Dr. Stewart felt what he supposed was a hard concretion in the appendix. It continued upward, however, and was finally lost behind the liver. He then concluded that he had to deal with a foreign body. This body he succeeded in getting down into the lumen of the appendix, and upon cutting off that organ, he was able to grasp and remove the foreign body, which proved to be an ordinary lead-pencil, a little over seven and a-half inches long. The blunt end of the pencil had been directed downward; the point upward behind the liver; and it had apparently occupied the entire length of the cæcum and ascending colon.

Upon questioning the man after the operation, he first asserted that he had swallowed the pencil twelve years ago, but as this was not credited on account of the anatomical difficulties a foreign body of this length would have to overcome before reaching the cæcum, he finally admitted that two years ago, while suffering from constipation, he had inserted the pencil into the rectum and it had slipped from his fingers and out of his reach. He then went to a hospital, where he was examined under ether, but no trace of the pencil was discovered. An attempt was also made to locate the foreign body by means of the X-rays, but failed.

TRANSACTIONS
OF THE
PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, December 4, 1905.

The President, HENRY R. WHARTON, M.D., in the Chair.

THE OPERATIVE RESULTS IN AN OLD FRACTURE OF THE
PATELLA.

DR. EDWARD MARTIN presented a man who in May, 1905, had by a direct fall upon the patella fractured that bone, the fracture probably being comminuted. Two months later he came to the hospital with his knee-joint absolutely stiff and very painful, the patella being firmly fixed by adhesion to the anterior surface of the lower articulating end of the femur, and also to the skin. Operation was performed in the usual way by turning a broad flap from above downward. The upper fragment was firmly adherent to the femur by tissue that was almost bony in character. After the removal of several small splinters, the bone and capsule were sutured in the ordinary manner, the patella with silver wire passed through drill-holes. The patient did well and at the end of three weeks went home with a freely movable patella and a painless smooth flexion of 45° . A few weeks ago he returned because motion in the knee was not sufficient to allow him to go upstairs readily or to stoop, positions required in his work. Examination showed that the joint appeared to lock and on forced flexion pain was felt on the outer side of the articulation. The patella was firmly united by bony union. Reopening the joint was considered, but under moderate anæsthesia flexion was carried to beyond a right angle. Two days later the joint was again bent,

under ether, and the patella refractured. Dr. Martin now intends to allow the man to go home with a slight separation of the fragments (maximum in flexion $\frac{1}{4}$ in.) as this may give him a more useful knee; he has been allowed to walk about since the fracture. The case illustrates that it is not necessary to transplant a soft flap between a patella which has grown to the femur and the surface of the latter bone after loosening their adhesion as the same result can be secured by passive movement of the bone. It also suggests that some of the good results reported from the use of such flaps may have been due to passive motion after operation. He also believed that a longer period of delay after operation before forcibly breaking up adhesions would have been desirable.

EXTENSIVE ANGIOMA OF THE FACE.

DR. MARTIN presented a boy of 12, who had been under treatment for eleven months. The angioma, which was noticed the second day after birth, involves the entire upper lip and extends well toward the left eye. It is adherent to the skin, the vessels of which are also affected, and extends into the mouth as far as the soft palate. Plastic operation seems out of the question, as any radical surgical proceeding could not help leaving an enormous scar and excessive disfigurement. Galvanopuncture was employed every second or third day for several weeks, the needle being inserted about the periphery of the mass but from this no distinct benefit was derived. The injection of absolute alcohol, 20 minims once a week, was then begun and has been carried out for some months. This procedure is followed by inflammation and contracture and is undoubtedly causing improvement. Dr. Martin is now contemplating the use of subcutaneous ligature or of causing a greater degree of inflammation by inserting sterilized catgut. The latter may be accomplished by passing a large hollow needle through the plexus of veins, having a piece of catgut through the lumen of the needle; withdrawing the needle, leaving the catgut in its place, and cutting both ends of the gut close to the skin. This should encourage the formation and subsequent organization of an extensive exudate.

DR. JOHN B. ROBERTS mentioned a case of angioma of the lip, in a child of three, recently under the care of Dr. J. P. Hutch-

inson at the Methodist Hospital. A good deal was gained in that case by subcutaneous ligature; and now Dr. Roberts is injecting with success boiling water after the manner of Wyeth. A year ago he operated on an infant with a large angioma of the brow which had been subjected to almost all the disfiguring operations resorted to in these cases, without permanent benefit. It was cured by the use of Wyeth's method. There seemed to be but little irritation caused by the injection, though five or six punctures were made at each sitting. The method is a very valuable one.

DR. RICHARD H. HARTE spoke of a case which some years ago was under the care of Dr. Hodge in the Presbyterian Hospital. It was similar to the case shown by Dr. Martin, except the growth did not extend so far toward the nares. Dr. Hodge succeeded in applying a ligature and this was followed by satisfactory results. Regarding the Wyeth method of using hot water, Dr. Harte had one case of angioma involving the hand and forearm in which he employed the injections extensively. His experience is that a great deal of care and caution must be exercised in its use. In many cases if water be used indiscriminately, disastrous results will follow. In angiomas injection does cause an inflammatory thickening and the mass shrivels and disappears. Dr. Harte finds that a great deal of reaction follows the injections; at one time he was quite alarmed by the after symptoms in his case.

URINARY INFILTRATION; ACUTE SEPSIS; RECOVERY AFTER PERINEAL SECTION.

DR. DE FOREST WILLARD reported the history of a mulatto, 24 years of age, who was admitted to the Presbyterian Hospital December 1, 1905, with a temperature of 104.2. He gave a history of gonorrhea six years previously with intervals of urethral discharge since that time. He had had no previous retention of urine, no ardor urinæ, except occasionally when the stream would be interfered with. An advertising doctor whom he visited in New York (according to his account) divided his meatus and apparently did an internal urethrotomy with an intensely infected instrument. He returned to Philadelphia the same even-

ing and drove about the city as coachman the following day, bleeding somewhat from the urethra. In the evening he had a considerable hemorrhage. On admission he was bleeding slowly from the urethra and the following day there was so much oozing that no instrument was passed. His perineum was bulging but was not hard, but was moderately tender. The following night he had two chills, after which his temperature rose to 108.4; pulse 176. The temperature was taken by the mouth by a careful nurse, and was verified a half hour later by the head nurse, when it was still 107.8; leucocytes 17,000 to 24,000; urine, blood tinged; bowels moved involuntarily in bed. Abundant staphylococci only in blood.

Dr. Hodge then made a median perineal section. An English catheter was inserted into the bladder and on a grooved director the urethra was split back to the prostate only. The catheter was left in the bladder and connected by a tube to a urinal. The hemorrhage was considerable but was controlled by packing. No pus was found, but the oozing of the septic products and toxins was free and the effect upon the temperature and pulse was speedily evident and improvement was rapid. He was discharged from the hospital in twenty days with an opening still in the perineum. Steel sounds to be passed at regular intervals to insure the formation of the proper sized urethra.

A peculiar part of the history is the insistence by the patient that the operation from which he so narrowly escaped death was performed, not for stricture, but for the cure of seminal emissions.

The reporter said that he had never before, save in sun-stroke, had a recovery when the temperature reached 108.4.

DR. WILLIAM J. TAYLOR said the man operated upon by Dr. Willard was in his employ. The urethrotomy was done on Tuesday afternoon and the man came to his work on Wednesday morning apparently perfectly well. He drove until 2 o'clock but was taken with a chill and fever in the afternoon. In the evening he became ill and was seen by Dr. Steele, who lived near his home, and sent to the hospital. Now a 28 French sound can be passed. The perineal wound is not yet skinned over but the man seems perfectly well and attends to his driving as usual.

BRADYCARDIA FOLLOWING HEAD INJURY.

DR. DE FOREST WILLARD reported the history of a man, 64 years of age, who was in good health until ten days previous to observation, when he had an attack of vertigo lasting but a few minutes, with no spasmodic symptoms. He was admitted to the Presbyterian Hospital November 21, 1905, with a slight scalp wound in the back of the head, reported to have been occasioned either by a brick having fallen upon him, or as believed by a fellow workman to have been occasioned by vertigo which had caused him to fall about four feet. Patient walked to the hospital, but while being dressed had a slight convulsion in which the face became cyanotic and was followed by snoring sleep of several hours but from which he could be easily aroused. Was dazed and slightly delirious for several days. There were no evidences of fracture; no paralysis; pupils slightly unequal for two days, afterward of same size. He lay most of the time with his eyes closed, quietly sleeping, but could be easily aroused and answered questions intelligently.

On entrance his pulse was 56, but fell steadily without diminution in volume until on the second day it reached 28; the fourth day 25; the seventh day 23; has continued in the twenties up to the present time,—*i.e.*, ten days. Respirations varying from 12 to 20; temperature 97. His arteries are very atheromatous, but he presents no evidence of valvular disease of the heart, although the muscle is weak. Heart sounds agree with pulse at wrist. Urine from 30 to 90 ounces daily. At first slight trace of albumen with a few casts; later, negative. Leucocytes 8000; hemoglobin 98%; red blood corpuscles 4,900,000.

The cause of this inhibition of heart action is difficult to explain and the point of interference with the pneumogastric or sympathetic is uncertain. He eats and sleeps well and appears to suffer no special inconvenience. Has no loss of motor or sensory power. As he had not been attended by any physician it is not known whether he had ever shown this slow pulse on previous occasions. Dr. Willard had never, save in opium poisoning, seen so slow a continuous pulse.

ASEPTIC FOREIGN BODY LEFT WITHIN THE CRANIAL CAVITY.

DR. JOHN B. ROBERTS reported the following case because of the unusual position in which a piece of sterile gauze was left after operation for trephining the skull.

A man was admitted to the Methodist Hospital on November 7, 1905, with a sinus above the right ear which was discharging a small amount of pus. He complained of severe headache, in the same region, and general convulsions accompanied by unconsciousness.

The history which he gave was to the effect that on July 1, 1905, he fell from the third story of a building, sustaining an injury to the head, for which he was subjected, in a hospital, to operation upon the skull. He was discharged cured in a month and returned to work. At this time he felt fairly well, although he complained of mild headache, progressive loss of hearing in the left ear and diminution of sight in the right eye. Two and a half months after the time of the original injury, he was struck upon the head in the region of the scar and promptly thereafter suffered an increase in the severity of the headache. In the course of a few days there was a discharge of a considerable amount of pus from a swelling at the region affected. The discharge of pus continued through the sinus left and was present when he came to the hospital for treatment. A week before his admission he had sharp pain at the site of the old scar, clinching of the hands and jaws and unconsciousness.

Examination upon admission showed a semilunar scar over the right ear and a sinus near the ear at the end of the former incision. There appeared also to be a slight discharge from the ear itself. The heart, lungs, liver and spleen showed on examination nothing abnormal. The reflexes were normal and the sensation unimpaired. Careful examination of the eyes and ears was not made at the time, because the patient's convulsions became so marked that Dr. Roberts proceeded to operation a day or two after his admission. The pain in the head and the convulsions were so severe, and the latter so frequent, that it seemed important to open up the sinus and search for a brain abscess rather than wait for extended study of the case. The region

affected was incised and developed evidence of a former trephining, and a sinus running into the cranial cavity. The opening, which was in the squamous portion of the temporal bone, was closed with thick fibrous tissue. A few drops of pus exuded from the fistulous tract, but no abscess cavity was found. There came to view, however, underneath the dura at the upper part of the trephine opening a piece of gauze, such as is used for packing wounds, firmly attached to, and interlaced with, the fibrous tissue. In order to withdraw this foreign body, it was necessary to cut out the mass of fibrous tissue which closed the opening in the skull and then cut away a portion of the bone at the upper edge of the opening. The original opening had been about $1\frac{1}{2}$ inches in diameter anteroposteriorly and three-quarters of an inch vertically. Careful exploration was made to see that no portions of gauze were left.

The wound was thoroughly cleansed and closed partially, but in a manner not to interfere with drainage. The dura, of course, could not be closed and it was necessary to provide drainage, because of the existence of pus before the operation was begun.

The plug of gauze removed was about the size of a hazelnut. It seems probable that at the time of the original operation, done by a surgeon in some other hospital, bleeding occurred and a piece of gauze was used to make pressure upon the divided vessel. It is evident that the operation was done with such aseptic care that prompt union without septic inflammation occurred. Whether the abscess, which subsequently occurred, was caused by the blow upon the side of the head received two months and a-half after the original injury, it is impossible to determine. From the short time after this injury that the abscess opened spontaneously, one would be led to believe that a chronic abscess had already formed before the blow upon the side of the head called the patient's attention to the matter.

Since the time that the gauze was removed, which is now about five weeks, the patient has had no special difficulty with the wound, except that he complains at times of pain in the head, and there is a protrusion of brain substance at the opening in the skull. This protrusion was to be expected, because there was neither dural covering nor bone over the brain at the site

of operation. It was impossible, and it would have been unwise, to cover in the opening in the calvarium.

The man has been irritable during convalescence and occasionally has violent convulsive seizures, clonic in type, accompanied with opisthotonos and pain in his head. The wound is in good condition; and pulse, respiration and temperature are practically normal. He is liable to get convulsive attacks and become excited, if he is kept in a ward with other patients or in a place where there is noise and confusion from people passing to and fro. When he has mild convulsions, which occasionally take place, the seizures are focal in type; the muscles of the neck pull his head to the right with the chin upward very much as if the spasm were in the left sternomastoid muscle; the head and eyes are deviated to the left without twitching of the face and eyes. At such times there is no involvement of arms, feet or legs in the convulsion. Recently he has been more apt to have the severe convulsions than the milder ones. In these there are clonic spasms of the extremities, with opisthotonos and violent shouting. The man is conscious and rational, except at the time of his convulsion. The convulsions, when severe, are described by the resident physician, Dr. Hall, as follows:—"The arms are sometimes extended, sometimes flexed, and shake with a fine tremor, being held quite rigid. The lower jaw is moved slightly up and down; the chin is rotated to the right and slightly elevated as if by action of the left sternomastoid. The eyes roll upward, sometimes looking directly upward, more often being deviated to the left. They are held immobile. In addition, the patient sometimes raises his hips up from the bed and rolls and threshes about, but the movements are in no definite order. They are such as any patient would show when suffering intense pain. After the convulsion is over the patient frequently complains of intense pain in his head and points to the right anteroparietal region." For a time these convulsions were very frequent and severe. Some of them are accompanied by vomiting, which occurred after the convulsion was over.

Large amounts of bromide potassium, some chloral, and hyoscine and codein have been used to quiet him. Occasionally it was necessary to confine him with straps or bandages. Chloroform has sometimes been given by inhalation to stop the convulsion.

The eyegrounds are apparently normal. There is no discharge from the ear. There are some casts in the urine. On account of the result of the recent urinary examinations, he has been given Basham's mixture as a diuretic.

The convulsions have seemed to be of a type which might, perhaps, be described as hystero-epileptiform.

THE EFFECTS UPON GLANDULAR TISSUE OF EXPOSURE TO THE X-RAYS.

DR. WILLIAM J. TAYLOR read a paper with the above title, for which see page 431.

DR. A. G. ELLIS said he had made no studies of X-ray tissue—those reported in the paper mentioned by Dr. Taylor. In the enormous literature which was accumulated, however, are many references to the untoward effect of this agent, and in the present state of our knowledge it should be used with caution. The numerous cases of sterility in X-ray workers reported by Dr. F. Tilden Brown are examples of its unexpected influence. The cases cited by Dr. Taylor further emphasize the necessity of careful and discriminate use of this illy understood force.

DR. JOHN H. GIBBON spoke of a case of enlarged cervical glands in which he had operated during the past summer. The patient in the spring had a prolonged treatment with the X-rays. The glands were most difficult to remove because of adhesions. It required two hours and ten minutes, with the help of an experienced assistant, to remove about thirty glands, whereas the next day twice this number were removed with the help of an inexperienced assistant in one hour. Every gland was so adherent that it required minute dissection to separate it from the surrounding tissues. It was impossible to remove the glands in a continuous chain.

It is regrettable that so many of the less radical measures which are employed in the treatment of surgical diseases cannot be used without interfering with subsequent operation, but yet this is a claim which is frequently made for them. No better illustration of this statement can be given than the difficulty encountered in operating for hernia where the injection treatment has been tried.

DR. RICHARD H. HARTE recalled a case of a child in which the cervical glands had been treated for some weeks with the X-ray, hoping by this means to avoid an operation. When, however, removal of the glands was attempted, the dissection was very difficult, as all the anatomical conditions were changed. The glands were adherent to the surrounding tissues, requiring forced dissection. In the course of a couple of weeks a small gland, which had been overlooked at the time of operation, broke down and suppurated. Dr. Harte is inclined to regard the use of the X-rays in cervical glands of the neck as most unsatisfactory.

TRANSACTIONS

OF THE

CHICAGO SURGICAL SOCIETY.

Stated Meeting, November 3, 1905.

The President, DR. D. A. K. STEELE, in the Chair.

PERFORATED GASTRIC ULCER.

DR. WILLIAM HESSERT reported two cases of perforated gastric ulcer and presented the patients.

CASE I.—D. H., aged 19, enjoyed good health up to seven years. From that time until fourteen she was in poor health. At fourteen the stomach symptoms began with pain in the region of the stomach; with vomiting, sometimes before, sometimes after, meals. She vomited blood. Her symptoms came periodically with remissions during which she felt fairly well and regained some strength. In June, 1903, she had a severe attack which was characterized by the sudden onset of severe pain in the left lower portion of the abdomen. This was so severe that she fell in a faint. She vomited. Pain was relieved after some hours, and subsided after three days. The abdomen became greatly distended; she was very sick for ten days, and was in bed about five weeks longer. After recovering from this attack, the periodical pain and vomiting recurred as before. Her general health was poor and she rarely felt really well.

July 5, 1905, at noon, she was seized with a pain again in the left lower quadrant of the abdomen. She had not yet had any dinner. Dr. D. E. Murphy saw her shortly after and found her in severe pain; shock; small, rapid pulse; cold extremities;

costal breathing; no vomiting; abdomen retracted and rigid. The whole left side of the abdomen was tender and the left abdominal muscles were tense. Morphine was given hypodermically. The speaker saw her at 8 P.M. in consultation. She had reacted somewhat; pulse still accelerated and small; slight rise in temperature. She had not vomited. Pain was somewhat relieved, but the abdomen was still tender and tense on the left side. She was put on rectal feeding and nothing whatever given by mouth. The pain subsided largely, and she felt fairly comfortable for two days, when pain increased and the abdomen became slightly distended. Her pulse and temperature went up to 114 and 101°, respectively. She was then removed to the Policlinic, where she was operated upon sixty hours after the first onset of symptoms. A longitudinal incision was made to the left of the median line from the costal arch downwards, three inches in length. On opening the peritoneal cavity some turbid fluid escaped. The stomach was pulled out of the wound. A perforation was found on the anterior wall of the fundus near the lesser curvature. The opening was sharply outlined, and was one centimeter in diameter. The tissues for a distance of three centimeters around the opening were thick and indurated, and of a dark red color. There were no adhesions anywhere about the stomach. The stomach contents had evidently escaped into the subphrenic space, there being evidence of peritonitis here, but the cavity below seemed but slightly involved. The opening was first closed with through-and-through silk sutures. Some difficulty was encountered, owing to tearing through of the sutures. The whole involved area was then inverted with two rows of silk Lembert sutures. No other perforation was found, nor scars. The field of operation was then sponged out and two cigarette drains inserted and the wound closed in the usual manner.

On coming from the table the pulse was 120; temperature 100.8°. She vomited some dark fluid subsequent to operation. She was put on rectal feeding. She rallied nicely from the operation, and did not have a great deal of pain. On second day her temperature was 100°, and pulse 70 to 80. In fact, for a week after operation her pulse went down to 60, and became somewhat irregular. Bowels moved regularly. Wound draining freely. During the second week her pulse and temperature were about

normal. On the tenth day she was, for the first time, allowed fluids by mouth, liquid peptonoids being given. This agreed with her. On the twelfth day broth and peptonized milk were given. Nutritive enemas were continued as they were so well borne. On the fourteenth day toast, milk, ice cream, and oatmeal were given. On the sixteenth day egg and toast. At the end of three weeks her wound had completely healed. She was on a light diet, had no pain, and was digesting her food well. Bowels regular; patient feeling fine; weight 82 pounds.

November 3, 1905. Her present weight was 126 pounds, more than she had ever weighed before. Her health was fine. There were no gastric symptoms whatever. Patient able to eat all kinds of food without distress.

CASE II.—Female, aged 62. Gave a history of having had symptoms referable to the stomach for the last fifteen years. Pain came on periodically, lasting for a month or so, during which time she vomited blood. There were periods of remission for a few months, during which she felt fairly well, and enjoyed the usual nourishment. She gained some in strength; but after a while the symptoms recurred. There were pain and vomiting again. This condition persisted for fifteen years, when, last October, she was admitted to the Cook County Hospital to the medical service. Previous to this time she had been in bed for five or six weeks or more, and was getting weak; nourishment was poor; no appetite; frequent vomiting, and a great deal of pain. She was transferred to the surgical side at the beginning of December. Before that time she was considerably emaciated. An indefinite mass could be felt in the left hypochondrium. A probable diagnosis of malignancy was made, and an exploratory laparotomy performed. Dr. Hessert found the mass was situated in the region of the lesser curvature on the posterior surface of the stomach, and in pulling the stomach up and manipulating it, in order to determine its outline, suddenly gastric contents escaped, and he found there was a perforation. At the time, he thought perforation was due to manipulation, but later developments showed that it was not due to manipulation, but to an old ulcer which had perforated and had resulted in the development of a large mass of indurated tissue, a perigastritis. At the time of the operation a probable diagnosis of carcinoma was made, and after having sutured the

opening in the stomach, the abdomen was closed, with the belief that the case would take the usual course of carcinoma. In this he was agreeably disappointed, as the patient grew better, though very slowly. She vomited and was unable to take much food. But this mass steadily decreased in size, so that in May, some five months after the operation, the former tumor had entirely disappeared, and long before this time he made up his mind that the patient did not have carcinoma, but a chronic perforation of an ulcer in the posterior surface of the stomach. She had so much pain and was in such distress that he agreed to operate again in the hope of relieving adhesions or relieving her condition by some further procedure. Accordingly, a second operation was performed on May 13, of this year. Careful examination of the stomach failed to reveal scarcely any traces of the former lesion. There was absolutely no induration, but simply a small scar at the site of the previous perforation. There were considerable adhesions about the stomach and the latter was adherent to the abdominal wall, but still the old induration was gone, showing how such a chronic perforating ulcer, with perigastritis, may simulate a carcinoma. He decided not to do a gastroenterostomy, but simply to loosen up the adhesions, and since that time patient has regained her health fairly well, but not as completely as one would wish for. She had considerable pain now at times. She was able to eat everything at times, but at other times could only enjoy a little milk or liquid food. She has vomited blood since the operation; but there was no sign of a tumor mass present.

DR. L. L. McARTHUR stated that in the present trend of surgical opinion, when the pendulum was swinging in favor of gastroenterostomy for every ulcer or symptom of ulcer of the stomach, he felt that a word of commendation and praise was due to Dr. Hessert for his courage in withholding gastroenterostomy under the conditions which obtained in the first case. If one followed the book-lore, as now obtaining, the tendency was to simply make a puckering string suture of the perforation and do a gastroenterostomy. To do this in a patient suffering with peritonitis of an extremely acute type, entailed an added shock and risk to the patient, which, in his opinion, was not always necessary, and particularly not necessary where a perforation ap-

peared definitely in a large, single, indurated, round, perforating ulcer of the stomach. In such cases he believed the practice of Dr. Hessert to close the opening and be content with that for the time being, rather than to complicate matters by the addition of a gastroenterostomy, was the more desirable practice, although not that which was now taught. It did not complicate matters very much, before putting in a puckering string and Lembert sutures, to make an excision of the indurated edges, bringing more healthy tissue together, perhaps avoiding leaving behind cicatricial tissue, which pathologists were inclined to believe formed a basis for later possible carcinomatous development. This was easy of performance and supplied far better tissue for the stitches than that which was furnished when leaving this indurated base. Other things being equal, he would suggest the removal of that indurated base, bringing all the structures together as in a suture of a wound of the stomach. He believed, too, that the emphasis Dr. Hessert placed upon the appearance of pain laterally, either in the left or right flank of the abdomen, frequently obtained with perforation of the stomach and was due purely to the anatomical landmarks which guided fluids in the outer gutter along the right or left of the colon. The emphasis, too, which Dr. Hessert placed upon the avoidance of medication by the stomach, or the administration of emetics to clear out a supposed case of indigestion, was extremely desirable. The speaker recalled a case in which red pepper and ginger ale, to provoke emesis, given to a patient with gastric perforation, added tenfold to the amount of pain. Another fact which was extremely significant in acute perforations of the stomach, was the board-like rigidity of the abdominal muscles which the sudden gush of the infective material seemed to induce in perforation of the stomach, far more marked, he thought, than in duodenal perforation, and he was sure very much more marked than in the alkaline contents from perforation of the appendix.

DR. WILLIAM M. HARSHA was reminded of a case he saw recently. The patient was a woman of 60. She was taken with very severe agonizing pain in the right side in the subhepatic region. She was brought to Chicago, and he saw her about six days after the onset of the attack. There was a board-like rigidity of the abdomen, but it was not in the iliac region. It was

limited sharply to the right hypochondrium. A diagnosis of perforated gall-bladder was made by her physician. An incision was made over the site of the gall-bladder, and nearly a quart of fluid found here, circumscribed, which did not go below the colon or into the iliac fossa, but between the liver and chest wall, and was confined to that area. The anterior surface of liver was stained by fluids. The patient was profoundly toxic and went on to fatal termination.

HALLUX VALGUS.

DR. A. E. HALSTEAD showed skiagraphs of a case of hallux valgus before and after operating. He also exhibited the patient, and mentioned the method of operating, which differed a little from the ordinary routine followed by surgeons in general.

He mentioned briefly the opinion of the writers of the present time regarding the pathology of hallux valgus. Formerly the opinion of Virchow that the condition was essentially an arthritis deformans, was generally accepted. Of late years numerous writers have disputed this theory. At present it is generally considered as being static in origin, the change at first being due to ill-fitting shoes. The relative lengths of the great and second toes undoubtedly has a bearing on the early changes that take place. Those in which the great toe exceeds in length the second are more prone to this deformity than those having the toes of nearly uniform length. The narrow-toed shoes first cause an abduction of the great toe, producing a prominence of the metatarso phalangeal articulation. Pressure upon this prominence causes an inflammatory thickening of the soft tissues, especially of the bursa over the joint. Continuation of this pressure soon induces a periostitis with deposit of bone at the head of the first metatarsal. Abduction of the phalanx brings pressure upon the outer portion of the articulating surface of the metatarsal and produces in time distortion of the joint with atrophy or destruction of the articular cartilage, and hyperostosis of the inner surface where the pressure is lessened. The inflammatory process spreading from the compressed soft parts also plays a certain rôle in bringing about changes in the joint that closely resemble the changes found in arthritis deformans. He

stated that some writers laid stress upon the place of attachment of the extensor tendon of the great toe as a determining factor in the production of hallux valgus. Just how this factor was responsible for the deformity he was unable from his observation to state. He had observed that after resection of the head of the metatarsal and freeing the inner aspect of the joint of fibrous tissue, while the insertion of this tendon was undisturbed, it had a tendency to draw the toe outward, maintaining the deformity.

In operating for the relief of hallux valgus, he employed an incision, slightly curved, over the inner surface of the joint. The inflamed bursa was excised. The joint was exposed and the head of the metatarsal removed by means of a Gigli's saw. The extensor tendon was fastened well down on the inner side of the first phalanx without severing its attachment beyond. The posterior portion of the sheath was divided about $\frac{3}{4}$ of an inch proximal to the metatarso phalangeal joint, the sheath split and the reflected portion brought down and sutured between the cut end of the metatarsal and the base of the first phalanx. This supplied a new synovial membrane for the joint, and effectually prevented an ankylosis. The wound was closed, most cases without drainage. When there was suppuration about the joint previous to the operation drainage was employed.

The foot was dressed by incasing the inner half in a molded plaster splint; patient allowed to walk after the first day.

He stated that in a series of about 15 cases treated in this way the results had been uniformly good, the patients being free from pain and excepting when extensive infection before the operation had existed, there was freer movement of the joint. In none was there complete ankylosis.

DR. ALEXANDER HUGH FERGUSON said he had made a curved incision over the upper surface of the joint through the skin down to the fibrous structure, exposing the tendon; then a longitudinal incision on each side of the tendon liberates it, still leaving it in its sheath; a long incision on the inner side exposes the bones and joint; excision of the head of the bone very much after the manner mentioned by Dr. Halstead is now completed, leaving the sesamoid bone. He placed the internal lateral ligament as a fold between the bones and sutured it there with catgut. The tendon is free, and a good deal more extension than

was represented in Dr. Halstead's case is obtained. However, the result in Dr. Halstead's case was excellent, considering there was suppuration.

DR. CHARLES DAVISON questioned the necessity of putting fascial tissue in between the ends of bone where the articular surface of the phalanx was not interfered with. He had done the operation many times, cutting the distal part of metatarsal bone away carefully, leaving the articular surface of the phalanx, with the idea that there would be no adhesions, no ankylosis, if the articular surface was not interfered with. In quite a series of cases he had seen no trouble from ankylosis, and all of his patients had free motion when he saw them last.

DR. HALSTEAD, in closing the discussion, stated that in advanced cases the synovial membrane and the cartilage of the joint were likely to be destroyed, and one would find nothing but spongy bone. This was true in his case. He had had about fifteen cases that were treated by operation, and his experience and that of others was that ankylosis was almost the rule where there was no intervening tissue placed between the ends of the bone.

In a paper published in the *Zeitschrift für Chirurgie* quite recently, a large number of cases were reported which showed that ankylosis was invariably the rule, when resection of the joint alone was performed. If there was a normal articular cartilage to the phalanx, it would be all right; but in this case the cartilage was destroyed leaving only the articular end of the phalanx bare and eroded. He had tried subcutaneous connective tissue fat and it worked very well, but it was much more convenient to take a piece of tendon sheath to interpose between the joint surfaces. One could utilize a piece of tendon sheath with greater ease than he could take a flap from the under surface of the skin.

ACUTE POST-OPERATIVE DILATATION OF THE STOMACH.

DR. A. E. HALSTEAD read a paper with the above title, reporting a case following nephropexy.

The patient presented the clinical features and termination of a typical case of acute dilatation of the stomach following fixation of a movable right kidney in an apparently otherwise healthy young woman. The clinical diagnosis was verified at autopsy.

DR. ALEXANDER HUGH FERGUSON said he lost a patient from acute dilatation of the stomach ten years ago. The operation was performed for appendicitis between the attacks. After the anesthetic, the patient was in good condition; his pulse was good; temperature normal, etc. As far as the temperature was concerned, the patient had no rise of it at any time. He died on the eighth day with enlargement of the abdomen, persistent nausea, persistent vomiting, and increased dullness. Post-mortem examination revealed the stomach filling the abdominal cavity and protruding into the pelvis to some degree. The area of operation was normal. There was no peritonitis; no adhesions. Obstruction was found at the pylorus, and although one could pass the ring finger through the pylorus, still it was obstructed by being acutely bent upon itself. The duodenum was not enlarged, but slightly smaller than normal. If the obstruction were between the duodenum and jejunum, then there would have been dilation of the duodenum.

The next case was one in which he removed the cecum. Vomiting and dilatation of the stomach persisted after the third day. The stomach was washed out every three or four hours, but the man soon became tired of this and decided to lavage his own stomach, which he did, by placing his head down near the floor and a pillow under his stomach. This man is alive and well to-day. In addition to these two post-operative cases of acute dilatation of the stomach, he had had three others, two in children, and one in a man, from over-distending the stomach with food.

DR. E. WYLLYS ANDREWS said that he reported some years ago five cases of drowning in fecal vomit in cases of intestinal obstruction, and discussed at that time the peculiar mechanism of the accident. He was lead to infer that the two orifices of the stomach were dilated when this drowning took place, and the intestinal contents from reverse peristalsis poured through the stomach out into the throat. Only in that way could he account for the enormous quantity ejected in the fatal cases. Since he had heard Dr. Halstead's paper and the discussion, he thought these cases might have been instances of acute dilatation of the stomach.

DR. L. L. MCARTHUR said he had learned his lesson in

regard to acute dilatation of the stomach through the death of a very dear friend who had been operated on for hysterectomy. The hysterectomy was made per vaginam. The patient developed no evidence of peritonitis, but had persistent nausea, with vomiting. Cases of acute dilatation of the stomach he believed were always associated with rather long intervals between the attacks of vomiting, then large quantities rather than frequent small quantities of fluid came away. The patient growing steadily worse, weaker and weaker, yet presenting symptoms which were to them intestinally obstructive in character, at three o'clock in the morning on the third day Dr. Frankenthal asked the speaker if he would not make an artificial anus to overcome a possible intestinal obstruction which might have taken place from adhesions down around the stump of the uterus, low down in the pelvis. To this he agreed, as it looked as if the patient were sure to die. He made a left inguinal incision, found a distended organ, very much like an enormously distended small intestine, but on endeavoring to raise it he found that it corresponded to the stomach. Pulling it out, he found it had the blood-vessels of the stomach, recognized it as the greater curvature of the stomach low down in the left iliac flank. Desisting from further operative interference, a stomach tube was passed and a gallon and a half of dark fluid removed. The incision was closed. We thought we had the case in hand, and that by passing a stomach tube on future occasions we would be able to prevent recurring dilatation of the stomach. The patient had one or two more periods of rest, but the stomach refilled, shortly after which she died. He thought in some cases it was not easy to differentiate between intestinal obstructive vomiting and that accompanying dilatation of the stomach.

DR. A. J. OCHSNER said that some time ago he directed attention to the fact that some patients upon whom gastroenterostomy or stomach operations of any kind had been performed died as the result of acute gastric dilatation. Several deaths had occurred before they had an opportunity to make an autopsy on one of these patients. Since then they had constantly watched this possibility of acute dilatation of the stomach, and had prevented it in several cases by having the patients sit up a few hours after the operation and making gastric lavage in case of any

symptoms. Last week a nurse reported in one case two days after a gall-bladder operation that there was something wrong, as the patient's temperature was not elevated, but at the time she reported this fact the pulse could not be counted. Dr. Ochsner found that the apex beat was very high; that the patient was suffering from dyspnea, and that she had the general appearance of a patient who was just about to die. He could not feel the pulse; the heart was simply fluttering. Having had this previous experience, and noting the position of the heart-beat and some abdominal distention, he simply introduced a stomach tube, when gas escaped with a good deal of noise, so that it could be heard all over the ward, and immediately the pulse went from 180 to 96. Distention of the abdomen with gas had displaced the heart. Had it not been for the fact of discovering the dilated stomach, he thought the woman would have been dead in another hour. He believed many patients died in that way, and that if one followed the rule of introducing a stomach tube when a patient was nauseated or complained of gastric distress after an abdominal section, a good deal of trouble and perhaps death could be avoided in a number of cases. This patient recovered.

CAPCINOMA OF THE APPENDIX VERMIFORMIS.

DR. JOHN L. YATES exhibited a specimen, which was removed by Dr. A. J. Ochsner from a woman, aged 75, two days previously. The diagnosis before operation lay between a neoplasm and an appendiceal abscess. Operation revealed both. The mass about the appendix was palpable through the abdominal wall, and at the time of the operation it was found that the sigmoid flexure had become adherent across the abdomen. A loop of ileum was also adherent, so that the removal required the excision of the loop of adherent ileum and the loop of adherent sigmoid flexure. Excision of the cæcum and distal end of the ileum, invagination of the ascending colon, and anastomosing the free distal end of the ileum into the upper portion of the rectum, with an end-to-end anastomosis between the severed ends of the loops of the ileum and the sigmoid. A satisfactory microscopic examination had not yet been made.

MALIGNANT GROWTH OF THE HEAD OF THE PANCREAS.

DR. E. WYLLYS ANDREWS showed a pancreatic tumor. A patient came under his care about a year ago with chylous ascites, due to a mechanical obstruction of the lymphatic system of the abdomen. He very early made out that the patient had malignant trouble presumably of the pancreas. Thinking it might be cystic or non-malignant, a laparotomy was made, which resulted in confirming the diagnosis of inoperable malignant growth of the head of the pancreas. The abdomen, therefore, was closed, the diagnosis having been easily made by the projection of the pancreatic growth between the stomach and the diaphragm (above the stomach). This patient had chylous fluid removed about seventeen times, and within three or four months afterward died of inanition, the specimen being secured by an autopsy. It showed the pathology very well. The solid mass—carcinoma—proved to be the head and half of the pancreas. Above it the stomach was already invaded by carcinoma; a small piece of liver tissue, which came away, was also invaded. The vena cava and aorta were adherent. The receptaculum chyli was entirely occluded, collapsed and pressed upon by the tumor mass.

INTUSSUSCEPTION.

DR. E. WYLLYS ANDREWS exhibited a specimen consisting of twenty-four inches of gangrenous intestine, which was the lower part of the ileum, and some living intestine attached, which was resected. This gangrenous intestine was removed a week ago by operation from a patient who had intussusception. Patient was a young, robust man, who, after jumping five or six feet down and lighting on his feet, began to have typical symptoms of intussusception. He was treated for a number of days, and then sent to the hospital. An immediate laparotomy was made by Dr. Andrews and twenty-four inches of the bowel was found invaginated, beginning some twelve inches above the ileocecal valve, so that portion of the intussusception had descended into the colon. At the time of the operation they retracted and brought out the full length of this intussusceptum, which was found to be gangrenous and putrid, decomposition having already set in. There was nothing unusual about the specimen

except after removing it the speaker found what he thought was the cause of the intussusception, namely, the presence of a pedunculated, fibro-papilloma, which hung by a pedicle four or five inches long, and had grown from the mucosa of the bowel for two or three inches up from the lower end of the intussusception. It was nothing more than one of those benign polypi which occurred in the bowel generally, and which the surgeon met with not infrequently in operating for hemorrhoids. They were pedunculated and attached themselves to the mucosa and simulated pile trouble. Occasionally they were of the nature of neuromata, but benign. This was like a cherry with a four-inch long stem. He did not discover this until he had removed it, and some time later had examined it. He was doubtful whether the pedunculated tumor was situated at the upper or lower end of the resected piece, but he thought it was at the lower end. The termination of the case was fatal. The omentum from which he dissected off this gangrenous loop of bowel was thoroughly thrombosed—bad looking. He observed thrombi in the radicles, of the veins extending off in some portions of the bowel which looked alive. In order to forestall extension of the gangrene, which would naturally follow thrombosis of the radicles in the mesentery, he removed quite a piece of living intestine. Not only did he do this, but stripped about five or six inches more of the intestine out through the abdomen, bringing it outside. The treatment of the distal or lower stump was simple, namely, cutting it off and invaginating it, going back almost to the cecum. Notwithstanding the removal of fifteen inches of the intestine which was actually dead, the patient was lost from perforation of the bowel a few days later, due to gangrene of the wall of the intestine, particularly that part of it still inside the abdomen, and leakage into the peritoneal cavity of some of the intestinal contents.

REVIEWS OF BOOKS.

ABDOMINAL OPERATIONS. By B. G. A. MOYNIHAN, M.S. (London), F.R.C.S., Senior Assistant Surgeon to Leeds General Infirmary, England. Octavo of 695 pages, with 250 original illustrations. Philadelphia and London: W. B. Saunders & Company, 1905.

Mr. Moynihan, in describing the preparation of the surgeon before operation in preantiseptic days, says that the operator felt adequately prepared when he had turned back the cuffs of his coat. The illustrations in the old works always depict the surgeon's cuffs and links; illustrations, mourns Mr. Moynihan, which are often borrowed and reproduced at the present time. However true this may be of the works of other authors and other publishers it is not true of the writer of "Abdominal Surgery" nor of his publishers. Considered merely from the typographical and artistic standpoint this book excels the older works just as much as the technique which it describes excels the clumsy methods of which they treated. When we compare the standard text-books of our time with the crude descriptions and illustrations of our student days we cannot but wonder at the successful work of our old teachers. Most works written twenty years ago are valuable now chiefly for their historical interest. One reads them with a serio-comic interest and a half pity for their readers, a certain degree of toleration for the publisher and artist. Kelly's "Operative Gynecology" set a new standard of excellence which publishers have been not slow to appreciate and adopt. This book of Moynihan is well clad, well printed, embellished with excellent half-tone illustrations, and worthily continues what the earlier work began. The text is concise but not abbreviated,

rich in descriptions of detail but not diffuse. The opening chapter contains much valuable and some new information on the bacteriology of the stomach and intestines. The statement that the *empty* stomach and intestine are sterile leads to suggestive reflection on the phenomena of fermentation in the alimentary canal from both the medical and surgical standpoint. The chapter is summarized in seven conclusions at its close, with some remarks on the sterilization of the whole tract. Under the head of preparation of the patient for operation the writer insists on the importance of thorough cleansing of the mouth as a preliminary to *all* operations. Most books restrict this suggestion to cases where the oral cavity is involved. If surgeons follow the author's advice it is not unlikely that the cases of postoperative pneumonia will diminish. We ought not to forget, however, the possibility that many cases of pneumonia of this class do not depend on a mouth infection at all but take their origin in the operation wound itself, being in the nature of infarcts, carried in the circulation from the wound to lung. The author devotes four hundred and sixty-six pages out of a total of six hundred and seventy to the consideration and description of operations on the stomach and intestines. It is hardly necessary to say that nothing of importance in this line of work has been omitted. The descriptions are clear but succinct and are well elucidated by the illustrations. Under the head of "Carcinoma of the Stomach" the statement is made that simple gastroenterostomy has a higher mortality than excision of the stomach which again has a mortality but little greater than that of exploratory incision. As a rule the operation of gastroenterostomy is done and will be done on cases in which excision is evidently out of the question, and such patients will always come to the operating table in worse condition than the earlier cases in which the complete operation can be done. As for the exploration, when the abdomen is closed without any further operative procedure it is because the conditions revealed are too desperate even for the

simplest measures of relief. These considerations should receive their due weight in estimating the relative actual mortality of the three operations. We can never know what the mortality of gastroenterostomy would have been if done in the cases of excision, nor of excision if attempted in the former cases. In the section devoted to operations on the intestines Chapter XX is taken up with the consideration of intestinal localization. Credit is given to Mall and Monks, and the latter is largely quoted. The succeeding chapters contain an account of intestinal sutures, not all of them, however, for which the reader should be grateful. The writer prefers the method of Connell. His opinion is that of many surgeons. The writer describes a method of suture of his own, but without illustration, which is to be regretted. A good illustration takes the place of a page of type and a good deal of pondering thereon. The chapter on intestinal obstruction contains much valuable advice. The author differs from many surgeons as to the advisability of administering morphine to these patients. Indeed he says "There is no absolute need to administer morphine; there is no justification for repeating the dose." Undoubtedly the use of morphine cannot have a curative effect in intestinal obstruction; nevertheless there are not a few conditions which simulate intestinal obstruction, and few operators would be willing to open the abdomen of a patient who was not vomiting who had little distention but much pain, not an unusual condition in obstruction, but one which obtains in other conditions not necessarily requiring operation, yet yielding to morphine. Of course no directions nor any number of maxims can supply individual judgment and the ability to nicely weigh the evidence on which diagnosis depends. On the other hand it seems to be going a little too far to advise that the drug shall not be repeated in the presence of certain symptoms which may or may not prove to be the result of an obstruction, and in which some delay is a necessary factor in diagnosis. Chapter XXXI treats briefly of the surgery of perforation oc-

curing during typhoid fever. Chapter XXXII deals with the subject of intestinal exclusion. The remainder of the volume is devoted to the surgical diseases of the liver, pancreas and spleen. The article on the pancreas and operations thereon is most complete. It is not too much to say that it is the most valuable treatise on this difficult and obscure branch of surgery that has yet been published. The chapters devoted to it form the logical and worthy culmination of a work which is a distinct addition to the library of every surgeon.

ALGERNON T. BRISTOW.

APPENDICITIS. By JOHN B. DEAVER, M.D. Third Edition. P. Blakiston's Son & Co. Philadelphia.

In this, the third edition of Deaver's treatise on Appendicitis, the author has produced a most attractive work which embraces this ever-interesting subject from the first days of its recognition up to the present time. In a careful review of its pages, one finds a complete and exhaustive study of every phase of this many-sided disease, comprising the combined ideas of almost every author of note who has contributed to the literature of the subject. In the main, however, the work is based on the writer's personal experience, which now includes several thousand cases. It is a notable fact, as Deaver points out, that most of the good work along the lines of diagnosis and technique of operating in appendicitis has been done by English and American surgeons.

A chapter of great interest is the one on "The Function of the Cæcum and Appendix." In this the experiments of Macewen are cited, which demonstrate the important rôle played by the appendix in the process of digestion, in that it supplies a goodly quantity of the succus entericus, the glands of Lieberkühn being much more numerous in the appendix and cæcum than in the small intestine.

The chapters on Diagnosis and Treatment together with

Operative Technique are all that could be desired, giving expression to everything that is modern and generally accepted by the surgeon of the present time. The plates illustrating the various incisions and methods of ligation and dealing with the stump are instructive and artistic. The author, as may be supposed, has made certain radical changes in his views on abdominal section in the presence of general peritonitis, notably in the technique of operation and the question of drainage. Several new chapters have been added, including one on "The Blood-Count in Appendicitis" and another on "Typhoid Appendicitis." There are in all sixty-four excellent plates, of which forty-two are new. A bibliography is appended.

WALTER A. SHERWOOD.

A PRACTICAL TREATISE ON SEXUAL DISORDERS OF THE MALE AND FEMALE. By ROBERT W. TAYLOR, A.M., M.D. Third Edition.

The third edition of this excellent work has been enlarged and improved in many ways. It is to be commended for its clear and simple method of dealing with this most difficult and troublesome class of cases. The book emphasizes the fact that intelligent and successful treatment can only be undertaken when the underlying cause of the disease is clearly understood.

HOMER E. FRASER.

DISEASES OF THE SKIN. By GEORGE THOMAS JACKSON, M.D., Chief of Clinic and Instructor in Dermatology, College of Physicians and Surgeons, Columbia. Fifth Edition. One 12mo. volume; 676 pages. Lea Brothers & Co., Publishers, Philadelphia and New York.

As in his former editions, the author has adhered to his scheme of alphabetical arrangement of the diseases, which renders its contents quickly accessible to either physician or student.

To the present volume there have been added several new sections, chiefly varieties of acne, among which the form

Telangiectodes is the only practical one, also several erythematous and granular conditions.

The author has written on this confusing subject clearly and concisely, giving symptomatology, diagnosis and treatment in a manner easily grasped. The text is well illustrated by engravings and several colored plates. One of the most pleasing features probably is the appendix, which contains formulæ for the various baths, lotions, powders, ointments, etc.

JAMES TAFT PILCHER.

CHIRURGIE OTO-RHINO-LARYNOLOGIQUE (Ear, Nose, Sinuses of the Facial Bones, Pharynx, Larynx and Trachea). By GEORGE LAURENS, Formerly Assistant in Oto-rhino-laryngology in the Hospitals of Paris. 8vo., pp. 976. G. Steinhil, Paris, 1905.

This treatise forms a large volume, most attractive, typographically. It is profusely illustrated. The claim of the publishers that it is the most complete work on the subject which has yet appeared seems to be a just one. The delineation by clear and correct cuts of the successive operative steps demanded in the various operations described is one of the most noticeable and valuable features of the book. The book, as a whole, well presents the extensive operative field which the surgery of that portion of the body to which it is devoted has come to involve. The treatise is divided into the five parts—The Ear, the Nose, the Sinuses of the Face, the Pharynx, the Larynx, and the Trachea. The plan of the writer is to first describe the method of examination and exploration of each organ whose surgery is to be treated of; then to discuss the various processes of local treatment applicable; in connection with which latter he dwells fully upon considerations pertaining to illumination, of anæsthesia and of hemostasis involved in each of the craniofacial cavities.

The manner in which middle-ear suppurations are treated is especially noteworthy for its comprehensiveness and complete-

ness. The modern radical mastoid operations, the surgery of the lateral sinus, otogenic abscesses of the cerebrum and of the cerebellum, and purulent meningitis are each clearly discussed and the possibilities of relief by opening the skull are studied. The results of the involvement of the facial nerve are also analyzed.

Larngo-tracheal surgery concludes the work, occupying two hundred pages,—Tubage of the Larynx, Laryngectomy, Tracheotomy, Tuberculosis of the Larynx, Foreign Bodies in the Air-passages—these are chief among the topics discussed in this section. Each topic is treated with much fullness of detail, and the book, as a whole, which forms a part of Berger and Hartmann's *Traité de Médecine Opératoire et de Thérapeutique Chirurgicale* may be accepted as representing in its department the teachings of French surgery of the present day.

LEWIS S. PILCHER.

DIE VERWUNDUNGEN DURCH DIE MODERNEN KRIEGSFEURWAFFEN.

VON STABSARZT DR. HILDEBRANDT. Berlin. 1905. August
Hirschwald. [Wounds from Modern Military Firearms.]

This work of 280 pages presents a very practical discussion of the wounds of modern small-arms in warfare, their prognosis and treatment in the field. The experience of the author as staff surgeon in the German army, and as surgeon with the troops in the Boer war and in the Chinese expedition of the allied armies, has given him authority and experience for such a work. It is well illustrated, and embodies the most advanced information upon this subject.

J. P. WARBASSE.

THE SURGICAL ASSISTANT. By WALTER M. BRICKNER, B.S.,
M.D. 1905. International Journal of Surgery Co. New
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experience of the author. It makes for system in surgical work and should be read especially by hospital internes. It is well illustrated and fills an important place in surgical literature.

J. P. WARBASSE.

CLINICAL DIAGNOSIS. By RUDOLF VON JAKSCH, M.D., Professor of Special Pathology and Therapeutics, University of Prague, etc. Fifth English Edition from the Fifth German Edition, Amplified and Edited by ARCHIBALD E. GARROD, M.D., etc., Lecturer on Clinical Pathology at St. Bartholomew's Hospital, Etc. Pp. 602. Illustrated, partly in color. London: Charles Griffin and Co. Limited. Philadelphia: J. B. Lippincott Company. 1905.

The fifth edition of Professor von Jaksch's "Clinical Diagnosis" in no wise falls short of the high standard set by the previous editions of this well-known book, nor has it lost anything by the death of its former translator, whose place Dr. Garrod has so ably supplied. The work has so long been a standard that little need be said by way of review. One need not eat a whole cheese to judge of its quality and a liberal taste here and there satisfies one of the excellence of "Clinical Diagnosis." One can find flaws, and perhaps a fair criticism is the rather brief mention accorded to the methods of staining blood-smears, especially for detecting the malarial parasites. The very convenient methods for using the various modifications of the Romanowsky stain, especially that of Wright, are not even mentioned. Neither is the Leischman-Donovan blood-parasite recorded, although trypanosomes are fully treated of. Urine is very fully considered, a new form of cast consisting of red blood-cells adherent to very large cylindroidal masses and occurring in occlusion of the renal artery being pictured. Intestinal parasites are very fully described and the chapters on the feces, stomach contents, sputum, and others, are excellent.

HENRY GOODWIN WEBSTER.

METHODS OF MORBID HISTOLOGY AND CLINICAL PATHOLOGY.

By I. WALKER HALL, M.D., Lecturer and Demonstrator in Pathology, Victoria University, Manchester, Etc., and G. HERXHEIMER, M.D., Prosector to the Städtisches Krankenhaus, Weisbaden. Pp. 290. J. B. Lippincott Company, Philadelphia. 1905.

The authors of this eminently useful handbook have succeeded in supplying what every laboratory worker as well as the occasional observer will at once recognize as a very desirable addition to his armamentarium—a compendium of histological, pathological and bacteriological technic. They have gathered together in compact and accessible form a very considerable number of formulæ for the preservation, preparation, cutting, staining and examination of tissues and organisms as well as careful directions for preparing the various reagents. They have carefully arranged and systematized this large mass of technical information which ordinarily has to be sought for scattered through text-books of clinical and microscopical diagnosis or in monographs not always easy of access. Their method of grouping the necessary steps in preparing material into chapters devoted to the separate processes is clear and commendable, while the hints as to those methods that their own experience has approved will doubtless be helpful to the more inexpert. Those of broader experience, too, will find a sufficient variety of methods and formulæ to suit their individual choice. An extensive bibliography shows the care that has been taken in compiling the book and will be helpful to the investigator who desires to study the original methods for himself. Hints as to where apparatus and materials may be obtained, while valuable for English readers, will hardly prove interesting to American students. Altogether the book can be heartily recommended to all who are working in laboratory diagnosis.

HENRY GOODWIN WEBSTER.

PRINCIPLES OF BACTERIOLOGY. Seventh Edition. By A. C. ABBOTT, Professor of Hygiene and Bacteriology, Director of the Laboratory of Hygiene at the University of Pennsylvania. Lea Brothers. 1905.

The latest edition of Dr. Abbott's Bacteriology has been revised and brought up to date in its subject matter by the elimination of many of the more infrequent organisms and the addition of newer ones with the improved cultural diagnosis.

Of particular interest in the latter groups are the paratyphoid and para-colon groups of organisms which have recently attracted attention by their isolation from clinical typhoid fevers.

The *Bacillus Dysenteriae* group has also been modernized, with the newer methods of isolation and identification of these closely allied organisms. In addition the antitoxins of this group have been discussed, with the clinical results of its application in infections from this source.

The greatest interest of this volume aside from its careful exposition of the various laboratory methods in the culture diagnosis, and activities of the various bacteria lies in its chapters on infection and immunity. The vast amount of literature which has been published on this subject has been carefully reviewed, and the results of the many investigations and researches are tersely set forth in such a manner as to be readily understood by every student of medicine.

The chapters alone stamp the volume of such merit as to be designated one of the best of the briefer bacteriologies.

FRANK ERDWURM.